

# THE IRON AGE

New York, February 8, 1923

ESTABLISHED 1855

VOL. 111, No. 6

## Heat Treatment of Steel Castings

Methods of Improving Physical Properties and the Bearing on Specifications—Effect on Impact Values of Electric and Open-Hearth Steel

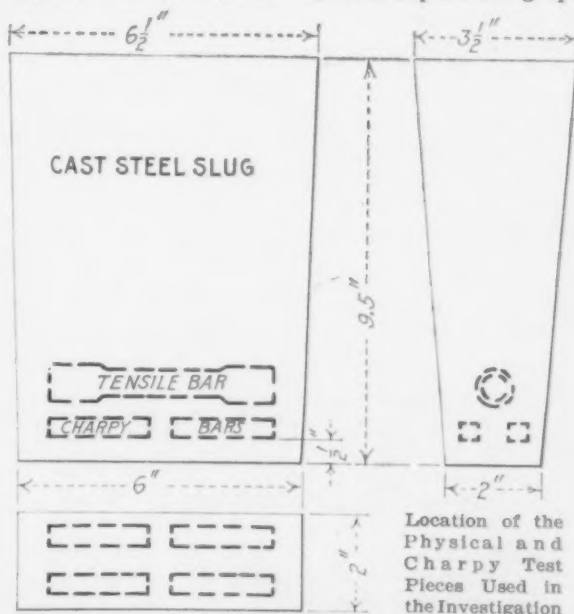
BY F. C. LANGENBERG\*

THE heat treatment of steel castings is a subject which has received serious consideration in some quarters for several years. The beneficial effect of a proper annealing treatment upon the properties of a steel casting is no longer questioned, but the advisability of quenching such material in a suitable medium, followed by the tempering or drawing operation, is not universally accepted.

Unfortunately, the physical tests obtained from a casting, regardless of the number of test coupons or the manner in which they are located, do not represent the strength of the casting as a structural unit. At points where changes of section occur in the casting—corners and other irregularities—serious internal strains are likely to be developed during solidification, resulting too frequently in interior checks, which are not apparent by surface inspection. The metal is also apt to be porous and spongy in localities where proper feeding has not occurred. Indeed, many castings are so designed that it is impossible for foundrymen to produce them without the presence of such interior defects.

A simple annealing treatment, when applied to plain carbon steel castings, has in general very little effect on the elastic limit and tensile strength, but does produce a decided increase in ductility, which results in a much greater resistance to impact stresses. Many castings of thin section will, in reality, have their elastic limit and tensile strength actually reduced by the annealing operation. Furthermore, a simple annealing operation tends to produce a uniform elastic limit and tensile strength throughout the entire section of the casting and brings it more nearly to the condition assumed by the designer in his calculations. Furthermore, as the thickness of section does not have such a

decided influence during a slow cooling operation, the test specimens taken to represent any given casting will more nearly represent the properties of the material in the casting itself than would be the case if the tests were taken in the unannealed condition or after a more rapid cooling operation.



Realizing that it is perfectly possible to take a given section of cast steel and by a simple heat treatment operation, such as a quench and draw, materially increase the elastic limit and tensile strength, and perhaps also the elongation and contraction of area, it naturally follows that attempts would be made to treat steel castings in the same manner. The designer might be informed that it is possible to increase the elastic limit from 35,000 to 50,000 lb. per sq. in., and as a result he would attempt to make savings in weight by reduction of the thickness of the casting, specifying the increased physical properties necessary for his

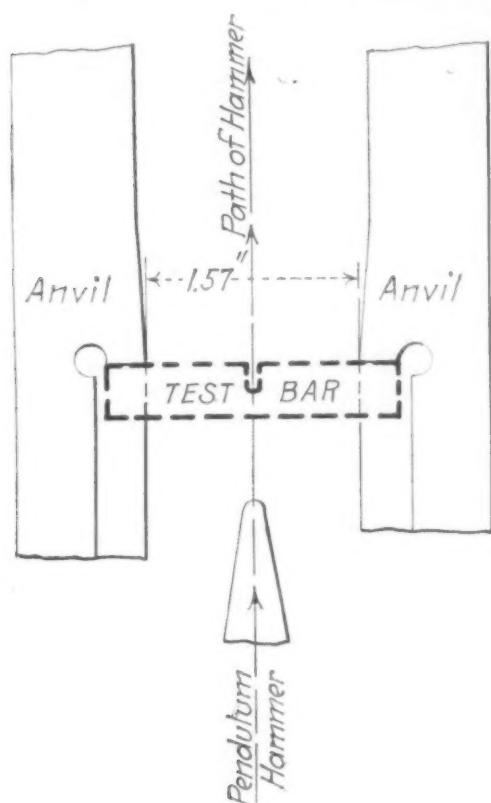
new design. In many cases, the design of the casting will be such that it would be a practical impossibility to give a satisfactory quench without serious cracking or warping. Even though it was possible satisfactorily to quench the casting, the serious danger is still present of the casting being structurally weak at the corners or in other points of change of section. The likelihood of the test coupons actually representing the properties of the casting is more remote in the case of a quench and draw than in the case of a simple anneal.

To summarize the situation relative to the heat treatment of castings for the purpose of obtaining additional structural strength, or a casting of less weight with the same strength, it is believed that a study must be made of each individual casting, and it is considered dangerous and a very unwise practice to submit to the designer a set of physical properties which can only be obtained by a heat treatment operation. After a study has been made of any particular casting, it is then pos-

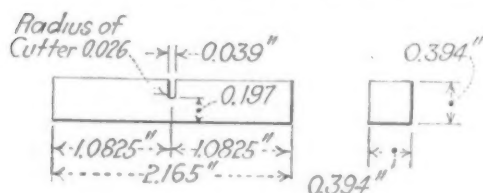
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sible after certain experimentation to furnish information on which the designer can rely.

There are many castings in which the question of wear is very important while the question of structural strength is not of as great importance. Undoubtedly the wearing properties can be materially increased by a suitable heat treatment operation, and this Arsenal has successfully produced many thousand track shoes and grousers which have been subjected to a quenching and drawing operation. These castings are of relatively thin section, approximately  $\frac{1}{4}$  in., and experience indicates that their life is materially increased by suit-



Details of the Test Specimens Used for the Charpy Results and Plan of the Method of Testing



able heat treatment. It is not believed that a study of the ordinary tensile properties is sufficient to determine the effect of various heat treatments upon cast steel of different compositions, and it is believed that the results of the impact test are of considerable assistance in predicting the service behavior of a given casting after different heat treatments.

A number of experiments has been carried out in the metallurgical laboratories at Watertown Arsenal in connection with foundry operations at this plant, and it is thought that a brief presentation of some of the results will be of interest. The chief application of the dynamic type of physical test has generally been to forged steels and other material, and although the methods of impact testing are now generally understood, it is thought that a brief description of the method and type of machine employed in these experiments may be of interest.

The machine used in the following tests is a Charpy pendulum machine, in which the blow or impact is delivered by a hammer swung as a pendulum. The pen-

dulum is raised to a known angle and allowed to fall, acquiring an amount of energy in its downward swing under the action of gravity which is at a maximum at the moment when the center of gravity of the pendulum is at the lower vertical, at which moment the force of gravity is perpendicular to the direction of motion of the hammer, and at this same moment impact with the test specimen takes place. The energy in the hammer at the moment of impact is readily calculated knowing the weight of the pendulum, the distance of its center of gravity from the axis of suspension and the height of fall. After impact and rupture of the test specimen, the hammer continues to swing. Neglecting friction and air resistance (corrections for which are made in actual testing) the pendulum would swing to the same angle on the one side of the vertical as the angle from which it started on the other side of the vertical, if no test specimen were present.

Impact and rupture of the test specimen absorbs a certain amount of the kinetic energy of the pendulum when it is at its lowest vertical position, and hence in its continued swing it will have only the excess energy

Table 1—Data and Results on Low Carbon Basic Electric Cast Steel

Casting	Treatments			Physical Properties					
	Temp. deg. C.	Time	Quench	No.	Yield Point, Lb. per sq. in.	Ultimate Strength, Lb. per sq. in.	Elongation per cent	Reduction of Area per cent	Charpy Ft. lb.
B5976	As Cast			13	20,000	43,000	26.0	34.8	8.88
									7.63
									7.32
									6.84
									Av. 7.67
									8.81
									8.85
B5976	825	2 hr. F.C.		12	17,500	43,500	25.0	40.3	8.39
									7.43
									Av. 7.12
									58.80
									53.50
B5976	925	2 hr. F.C.		2	27,500	46,000	34.5	54.6	61.00
									49.00
									Av. 55.58
									43.22
									49.40
B5976	825	4 hr. F.C.		3	20,000	45,500	31.0	67.0	30.29
									37.90
									Av. 40.20
									42.54
									43.38
B5976	925	4 hr. F.C.		4	27,000	46,000	36.5	54.6	52.94
									42.71
									Av. 4
									55.10
									54.15
B5976	925	2 hr. Air		5	30,000	47,000	36.0	54.6	61.80
	500	2 hr. F.C.							69.90
									Av. 57.71
									65.85
									69.50
B5976	925	2 hr. Water		6	29,000	48,000	41.5	71.4	68.80
	675	2 hr. F.C.							71.15
									Av. 68.32
									69.15
									68.00
B5976	925	2 hr. Water		7	32,500	53,500	35.0	64.7	62.75
	600	2 hr. F.C.							60.00
									Av. 64.98

after deducting the energy absorbed in rupture of the specimen from the maximum energy. This excess energy is easily deduced by noting the angle to which the pendulum swings after impact, and thus the energy absorbed at impact is obtainable.

In the tests, the results of which are given later, the Charpy machine had a hammer weighing about 50 lb. and delivering a blow of about 217 foot pounds of energy.

The test specimens are small rectangular notched bars of the dimensions as shown in one illustration. The specimen when placed in the machine rests on two supports as a beam, and is struck by the hammer at a point directly opposite the notch, the arrangement of the test specimen in the machine (or on the "anvil" as it is called) is indicated in another illustration.

The notch is made in order to prevent deformation of the material and concentrate stress at a certain

point so that actual rupture without deformation may be obtained.

The material used in the tests was steel made in a 6-ton basic lined Heroult electric furnace. Slugs were cast from production heats, and four impact test specimens and one tensile test specimen were cut from each slug. The dimensions of the slugs, and the location of the test specimens are shown in an illustration. The heat treatments were carried out in the metallurgical laboratory, heating being done in Hoskins electric furnaces controlled by base metal pyrometers recording on Leeds and Northrup recorders. The slugs were heat treated before the test specimens were machined.

The analysis of the two heats tested was as follows:

No.	Carbon, Per Cent	Manga- nese, Per Cent	Phos- phorus, Per Cent	Sulphur, Per Cent	Silicon, Per Cent
B5976	0.11	0.36	0.015	0.020	0.180
C6903	0.49	0.60	0.014	0.014	0.305

The tensile properties and the impact test results are shown in Tables 1 and 2.

The first treatment was a simple anneal at 825 deg. C. (1517 deg. Fahr.) for 2 hr. The physical properties

Table 2—Data and Results on High Carbon Basic Electric Cast Steel

Treatments				Physical Properties					
Casting	Temp. deg. C.	Time	Quench	No	Yield Point, Lb. per sq. in.	Ultimate Strength, Lbs. per sq. in.	Elongation per cent	Reduction of Area	Charpy ft. lb.
C6903	As Cast			13	45,500	80,000	7.5	5.8	2.71
									3.01
									3.09
C6903	825	2 hr.	F.C.	12	46,000	81,000	15.5	20.0	2.14
									Av. 2.74
									10.61
C6903	825	2 hr.	F.C.	2	43,500	79,500	15.0	20.5	11.44
									10.23
									Av. 10.85
C6903	825	4 hr.	F.C.	3	44,500	81,000	15.0	20.5	10.51
									10.88
									Av. 10.91
C6903	925	4 hr.	F.C.	4	44,500	79,000	14.0	17.0	10.06
									9.9
									Av. 10.39
C6903	925	2 hr.	Air	5	49,000	85,000	17.0	20.5	11.54
									11.68
									Av. 11.61
C6903	925	2 hr.	Water	6	50,000	82,500	21.0	34.8	13.78
									13.20
									Av. 13.42
C6903	925	2 hr.	F.C.	7	56,500	94,500	15.0	30.5	17.68
									15.80
									Av. 16.93
C6903	925	2 hr.	Water	7	56,500	94,500	15.0	30.5	17.26
									Av. 16.92
									14.68
C6903	925	2 hr.	F.C.	7	56,500	94,500	15.0	30.5	15.27
									14.23
									Av. 14.61

of the low carbon heat were practically unaffected by this low temperature anneal, whereas the elongation and contraction of the high carbon heat were very materially increased, the yield point and ultimate strength, however, remaining practically the same. The resistance to impact on the high carbon heat was increased by this simple anneal at 825 deg. C. approximately four times the value obtained in the cast condition.

The next treatment was a simple anneal at a higher temperature, namely 925 deg. C. (1697 deg. Fahr.). This anneal at a higher temperature increased the impact value on the low carbon steel over 700 per cent, but on the higher carbon heat did not improve the impact values over those obtained on the lower temperature anneal. It will also be noted that the higher

anneal on the high carbon heat reduced slightly the elastic limit and tensile strength.

The next operation was to repeat the two anneals, increasing the period of soaking from two to four hours. The results obtained upon the higher carbon heat were very little affected by this increased period of time at the annealing temperature, whereas on the low carbon heat the longer period at 825 deg. C. (1517 deg. Fahr.) did result in a decided increase in the impact properties over those obtained by an anneal for two hours at the same temperature. The explanation of this, however, is quite simple. During the 2-hr. anneal at 825 deg. C. the material did not pass through the critical range, whereas during the 4-hr. anneal at 825 deg. the material had passed through the range at some stage during the soaking period.

The next treatment applied to both heats was an air chill from 925 deg. C. (1697 deg. Fahr.) followed by a draw at 500 deg. C. (932 deg. Fahr.). The results on the high carbon heat are of particular interest. The yield point and ultimate strength have been increased, as have also the results of the impact test.

The next two treatments applied consisted of water quenching from 925 deg. C. (1697 deg. Fahr.), followed by a drawing operation at 675 deg. C. (1247 deg. Fahr.) and 600 deg. C. (1112 deg. Fahr.) respectively. Referring first to the tests resulting from the coupons drawn at 675 deg. C., it is to be observed that associated with the increase of yield point and ultimate strength is quite a material increase in the results of the impact test. On the material drawn at 600 deg. C. the yield point and ultimate strength are higher than obtained from the draw at 675 deg., which is, of course, as would be expected. It should be further noted that the impact values, although exceptionally good, are not as high as those obtained when the draw was carried out at the higher temperature.

Before leaving the discussion of these results, it is again desired to point out some of the dangers resulting from a direct application of results such as presented in the accompanying tables. Assume that heat C6903 was made to meet the following requirements:

Yield Point, Lb. per Sq. In.	Tensile Strength, Lb. per Sq. In.	Elongation, Per Cent	Contraction of Area, Per Cent
36,000	80,000	14	20

With slight tolerances any of the tensile tests reported would meet the specification enumerated above. If in the design of some casting the question of weight is becoming very troublesome, the designer upon an examination of the table might conclude that he could write a specification calling for:

Elastic Limit, Lb. per Sq. In.	Tensile Strength, Lb. per Sq. In.	Elongation, Per Cent	Contraction of Area, Per Cent
50,000	85,000	14	25

basing his deductions upon the results obtained by quenching the material from 925 deg. C. (1697 deg. Fahr.) in water and subsequently drawing at 600 deg. C. (1112 deg. Fahr.). If the casting was of simple section and comparatively uniform throughout, his expectations might be fully realized in practice, but the attempt to apply such a specification to any general line of miscellaneous castings would lead to very dangerous consequences, and ultimately result in many disappointing failures.

A similar set of experiments, although less detailed, was conducted on an acid open-hearth heat of the following composition:

Carbon, Per Cent	Manganese, Per Cent	Silicon, Per Cent	Sulphur, Per Cent	Phosphorus, Per Cent
0.30	0.62	0.18	0.038	0.038

The three treatments applied were as follows:

Treatment A: Heated to 900 deg. C. (1652 deg. Fahr.), soaked two hours at this temperature and water quenched,



followed by drawing two hours at 650 deg. C. (1202 deg. Fahr.) and furnace cooled.

Treatment B: Heated to 900 deg. C. (1652 deg. Fahr.), soaked two hours at this temperature and furnace cooled.

Treatment C: Heated to 950 deg. C. (1742 deg. Fahr.), soaked two hours at this temperature and cooled in air, followed by drawing two hours at 500 deg. C. (932 deg. Fahr.) and furnace cooled.

The results of these tests are shown in Table 3. From an inspection of the mean results of the tests it is evident that water quenching has raised the elastic limit approximately 10,000 lb. per sq. in. and the tensile strength 8000 lb. per sq. in. over that obtained by a simple furnace anneal. Furthermore, this has been accomplished with but little sacrifice of ductility. The shock strength, as measured by the Charpy impact resistance, has been increased from 11.32 to 14.25 ft.-lb.

The air-chilled specimens show an increase in both elastic limit and tensile strength of approximately 3000 lb. per sq. in. over that obtained by a simple furnace

Table 3—Physical Properties of Cast Steel of Different Heat Treatments (Acid Open-Hearth)

Marks	Yield Point, Lb. per Sq. In.	Tensile Strength, Lb. per Sq. In.	Elongation, Per Cent	Reduction of Area, Per Cent	Charpy Impact Test, Ft.-Lb.	Brinell Hardness
A.....	58,500	88,000	15.0	24.0	Average of 7 tests	187
A.....	56,500	84,500	11.5	16.9	14.25	171
A.....	57,500	89,500	19.5	27.4		171
Average	57,500	87,333	15.3	22.8		176
B.....	44,000	75,000	10.5	20.5	Average of 8 tests	156
B.....	50,000	82,500	25.0	37.0	11.32	153
B.....	45,000	80,500	19.5	24.0		159
Average	46,333	79,333	18.3	27.2		156
C.....	49,000	81,000	12.5	20.5	Average of 8 tests	163
C.....	49,500	85,000	21.5	30.7	11.87	160
C.....	50,000	82,000	14.5	20.5		156
Average	49,500	82,666	16.2	23.9		159

anneal. This increase is in good agreement with that observed in the foundry annealing practice at this Arsenal in the production of what would correspond to the medium of hard grades of steel castings as specified by the A. S. T. M.

### Conclusions

In conclusion, the author emphasizes that:

First—Although experiments prove that physical properties, including resistance to impact, of cast steel of a given composition can be materially improved by the quenching and drawing operation, it is not advisable to prescribe in a general specification a set of physical properties which cannot be obtained by a simple annealing treatment.

Second—Interior defects and irregularities of steel castings are very apt to make the quenching operation exceedingly dangerous as regards development of cracks, it being practically impossible to quench castings of certain design without the development of checks and cracks which may not always be apparent upon surface examination.

Third—A casting which has been quenched and drawn can be very advantageously used for many purposes if the design will permit of its proper treatment. In case the heat treatment of a given casting is desirable in order to obtain better physical properties, a study should be made of the casting in question and special physical requirements and specifications developed for each individual case.

### Morse Chain Co.'s New Plant

The Morse Chain Co., Ithaca, N. Y., is now operating in its new Detroit plant on West Warren Avenue, the increased automotive production in that district and the accompanying demand for the company's products having necessitated increased manufacturing facilities. The company established a branch factory in Detroit three years ago at Eighth and Abbott streets, as industrial conditions in Ithaca did not warrant expansion in that city. The new plant is a one-story, concrete and steel building with 60,000 sq. ft. of floor space giving adequate room for manufacturing and offices. A year ago, the company acquired a five-acre tract on West Warren Avenue on the Detroit Terminal Railway and it is in a position to expand its plant as the demand for its products increases.

The Morse Chain Co. specializes in the making of chain drives for industrial transmissions and perfected the application of silent chains to cam and accessory drives in automobile engines. The Detroit plant under the management of F. C. Thompson will manufacture all sprockets and adjustments used in Morse front end drives and the new Morse silent chain bus transmission.

### Inland Steel Co. Earnings

The Inland Steel Co. wound up 1922 with a surplus of \$127,168 shown on the income account, whereas there was a deficit of \$503,236 at the close of 1921. This showing is all the more impressive in view of the fact that no reduction was made in the amount paid out on dividends last year, while something like \$100,000 more was set aside for depreciation, etc., than in 1921. The net earnings of the company last year after allowing for Federal and all other taxes amounted to \$2,434,023, whereas in 1921 they were \$1,728,031. Depreciation charges amounted to \$1,004,336, as against \$911,993 in 1921, while the bond interest charges were scaled down from \$305,310 in 1921 to \$288,510 last year, leaving a net profit of \$1,141,177. The net surplus for 1921 was \$510,728. At the close of last year the profit and loss surplus stood at \$18,332,613; at the close of 1921, it was \$18,205,445.

### Dates of Foreign Trade Convention Changed

The dates on which the tenth national foreign trade convention will meet in New Orleans have been postponed to May 2, 3, 4, 1923, according to announcement of O. K. Davis, secretary of the National Foreign Trade Council.

The convention will devote special attention to the European situation, the part played by imports in our national life, and transportation by rail and water. Group sessions will deal with the practical details of export sales management, finance, credits, and advertising, with particular consideration of problems affecting the Gulf Coast and the Pacific.

Employee representation and what has been accomplished by the Pennsylvania Railroad and other companies, will be the subject of an address by Sherman Rogers, industrial correspondent of the Outlook Co., before the New York chapter of the Society of Industrial Engineers, to be held in the Engineering Societies Building, New York, Feb. 12. E. S. Cowdrick, recently with the Colorado Fuel & Iron Co., Denver, will lead the discussion.

To determine the magnetic properties of short bars, apparatus has been designed and calibrated by the Bureau of Standards. The description of the apparatus and the results obtained are discussed in Bulletin 458, issued by the bureau and obtainable at 5c. a copy on application to the Government Printing Office, Washington. It is pointed out that the magnetic properties may be ascertained of pieces as small as about ¼ in. in diameter and ½ in. long.



# Fuel Gas Question in Steel Industry

Dependence Cannot Be Placed on B.t.u. Values in Comparing Fuels—Pyrometric Efficiencies and Flame Temperatures Important

BY F. J. DENK.\*

ESSENTIAL for every operator of a furnace is that he knows, not how much heat per pound or per cubic foot of fuel is available at the burner or port, but what part of this heat will be used for the work during the time unit. This is the whole secret of efficient operation of a furnace, a secret which, however, has been known to a few only, while the large majority of furnace men still adhere to the old idea, that a fuel gas is the better, the higher its heating value.

The fuel gases mostly applied up to the present time in the steel industry are natural gas and producer gas. Blast furnace gas is not considered in the following, as it is used mostly for steam raising or air-compressing purposes in the interest of the blast furnaces directly. The use of natural gas, as is well known, is decreasing rapidly on account of the increasing shortage of this fuel. In many mills it has been replaced by producer gas but, during the last years, the increase in the number of coke oven plants for blast furnaces has made available large quantities of medium grade coke oven gas, which is used in open-hearth furnaces and for other purposes around the steel plant. Coke oven gas is a better substitute for natural gas than is producer gas, but it can not be produced everywhere and is, therefore, necessary to turn, for certain purposes, to another fuel, which will work like coke oven gas.

This gas has been found in the so-called duo-gas, which is a combination coal and water gas. The underlying principle of the manufacture of this gas has been developed in Europe during the last 10 or 15 years.

They have succeeded in producing a high-grade water gas, using the volatile matter and the tarry vapors in the coal for other purposes. The American manufacture differs from the European in the fact that the tarry vapors and the volatile matter are made use of

by way of turning them into fixed gases, thus adding a considerable amount of valuable combustible matter to the water gas. This means a decided advantage over present European practice, as far as the gas proper is concerned.

The application of coke oven gas has met with some opposition, as it was believed that this gas could not do the required work. However, tests made in the United States as well as abroad have shown that, actually, 1 cu. ft. of coke oven gas can do the same work as 1 cu. ft. of natural gas, notwithstanding the fact that the heating value of the latter is more than twice that of the former. The reason for such conditions can be found in the following:

It was said above that the efficiency of a fuel depends upon the amount of heat which can be made available for the work to be done. This amount, in turn, depends upon the flame temperature and the latter upon the quantity and specific heat of the waste gases.

The heating value of the gas is, therefore, of no influence upon the efficiency, but of large influence is the "pyrometric efficiency."

The heat available in a furnace and produced by a certain kind of fuel in a unit of time can be found by dividing the available heat by the volume of the waste gases. If  $Q$  = total heat, and

$V$  = volume of the waste gases,

then  $\frac{Q}{V}$  = the heat entering the furnace during the

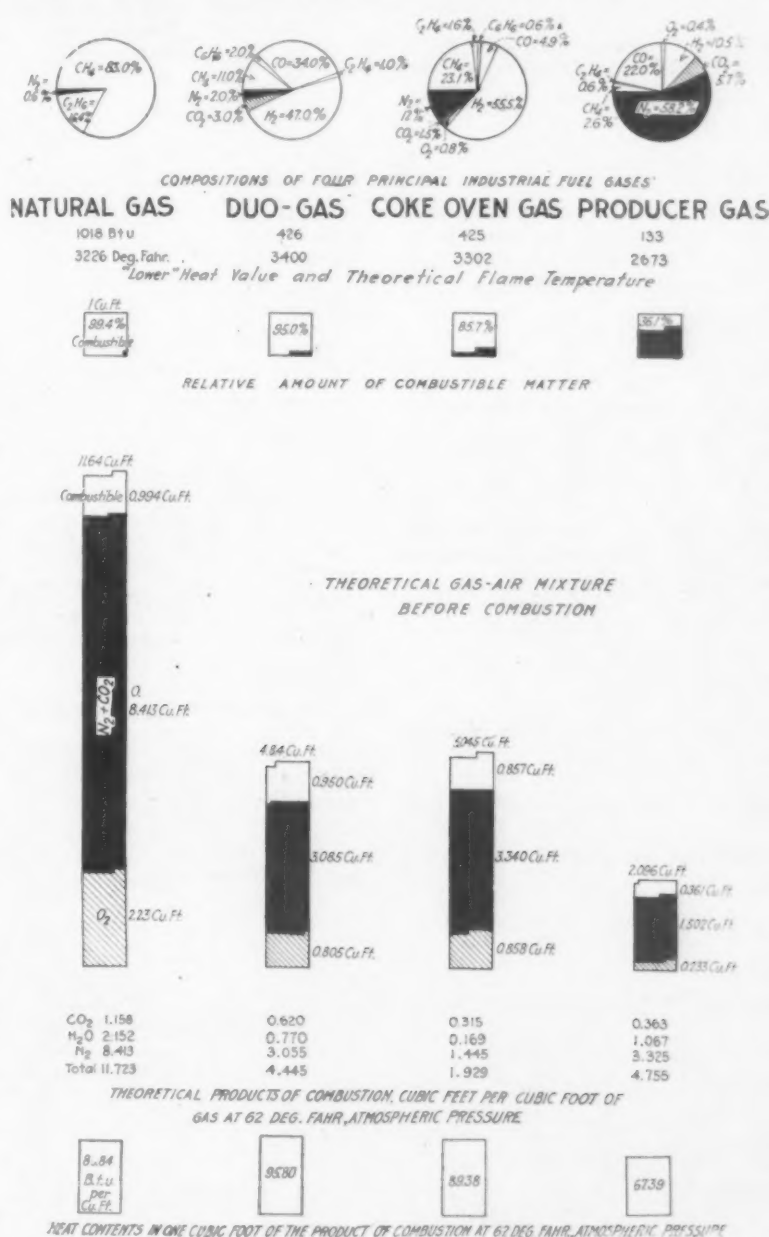


Fig. 1. Comparison, on Four Different Bases, of Four Metallurgical Fuel Gases—Natural Gas; Duo-Gas; Coke Oven Gas; Producer Gas

\*Mr. Denk was a consulting engineer, practicing in Pittsburgh. He died May 18, 1922, and the article represents his last work of the kind.

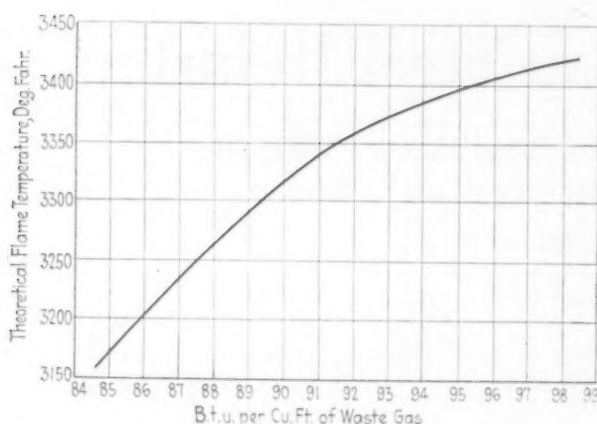


Fig. 2. Relation Between Flame Temperature and the Heat in the Waste Gases

time unit. According to the laws of heat transmission, the heat which can be made useful for operation will be:

$$Q_t = e \times \frac{Q}{V}$$

The heat transmission by convection is:

$$Q_t = z \times k \times d_m.$$

For the comparison of different fuels, the heat transmission coefficient  $k$  is constant; the same holds good for  $z$ , which represents the time for the heat transmission for different fuels at the same efficiency. It is

$$\text{therefore } e \times \frac{Q}{V} = d_m, \text{ or } e \times Q = d_m \times V.$$

But, for the same work of all the fuels, the left side of the equation, i.e.  $e \times Q$ , is constant. For this reason, the measure for the comparison of the fuels is represented by the right side of the equation. This means that the criterion for the efficiency of a fuel is the volume of waste gases, multiplied by the difference between the flame temperature and the working temperature, or, in other words, the efficiency of a gaseous fuel depends upon its pyrometric efficiency.

This result can be expressed by an equation which will permit the calculation of comparative values of different fuels. The equation reads

$$E = \frac{T_t - T_b}{T_g - T_b} \times \frac{V_t}{V_g}, \quad (1)$$

where  $E$  represents the equivalent value of the new gas in comparison with the one used before, or the one which it shall replace,

$T_t$  represents the actual flame temperature of the new gas,

$T_g$  represents the actual flame temperature of the old gas,

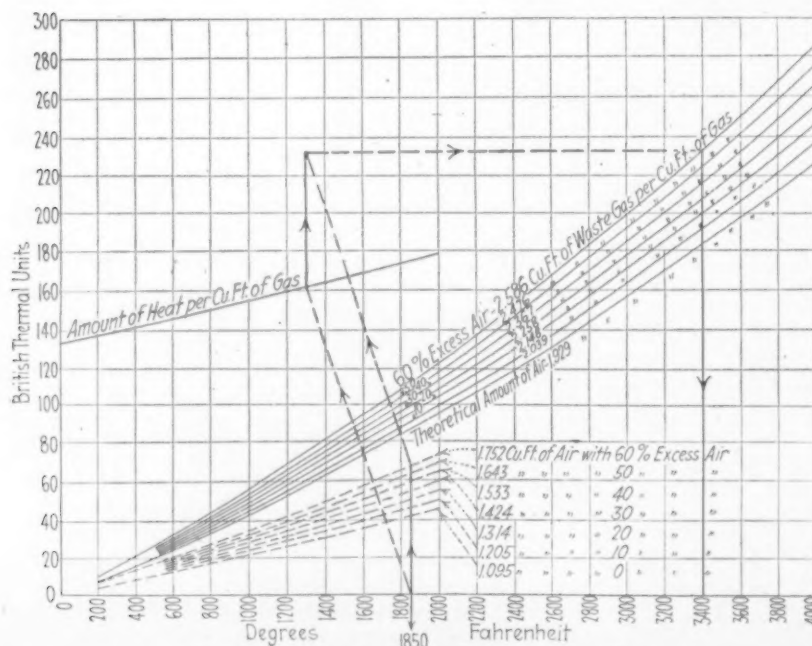


Fig. 3. Combustion Curves for Producer Gas

$T_b$  represents the temperature in the furnace (working temperature)

$V_t$  represents the volume of waste gases per cubic foot of the new gas under operating conditions, and  $V_g$  represents the volume of the waste gases per cubic foot of the old gas under operating conditions.

The application of this formula (1) will show the fallacy of the old creed, that "a B.t.u. is a B.t.u." It will be used later for giving comparative values, after the properties of the different gases in question have been described and explained in detail.

Analyses and properties of the four steel-industry gases are given in Table I and in Fig. 1. This diagram shows the same data as the table, with the exception of the one row, marked "B.t.u. per cubic foot of gas-air mixture." This row has been added to the table because the values given there have often been cited as a proof that there is not much difference between the different gases, because these heat values do not differ

Table I  
Properties of Industrial Gases.

Gas	Natural			Producer Gas
	Gas	Coke Oven Gas	Duo-Gas	
Methane* CH <sub>4</sub> .....	83.0	23.1	11.0	2.6
Ethane* C <sub>2</sub> H <sub>6</sub> .....	16.4	...	...	...
Ethylene* C <sub>2</sub> H <sub>4</sub> .....	...	1.6	1.0	0.6
Benzole* C <sub>6</sub> H <sub>6</sub> .....	...	0.6	2.0	...
Carbon monoxide*				
CO .....		4.9	34.0	22.0
Carbon dioxide* CO <sub>2</sub> .....		1.5	3.0	5.7
Hydrogen* H <sub>2</sub> .....		55.5	47.0	10.5
Oxygen* O <sub>2</sub> .....		0.8	...	0.4
Nitrogen* N <sub>2</sub> .....		12.0	2.0	58.2
Total* .....	100.0	100.0	100.0	100.0
B.t.u. per cu. ft.....	1,018	425	426	133
Air required per cu. ft.....	10.64	4.06	3.84	1.10
Total gas-air mixture .....	11.64	5.06	4.84	2.10
B.t.u. per cu. ft. gas-air mixture.....	87.4	84.0	88.0	63.3
Waste gases, cu. ft. per cu. ft. fuel gas .....	11.723	4.755	4.445	1.929
B.t.u. per cu. ft. waste gas.....	86.84	89.38	95.80	67.39
Flame temperature deg. Fahr.....	3,226	3,302	3,400	2,673
Weight per cu. ft., lb. ....	0.048517	0.030003	0.043019	0.067205
Specific weight.....	0.6362	0.3933	0.5641	0.8812

\*Per cent.

very much—with the exception, of course, of producer gas, which, on account of its high percentage of inerts, appears to be in a class by itself. The values for the three other gases are 87.4, 84.0 and 88.0 B.t.u. per cu. ft. of gas-air mixture, respectively. The corresponding flame temperatures are: 3226 deg., 3302 deg. and 3400 deg. Fahr., or an increase between natural gas and coke oven gas for decreasing heat value of the mixture, and an increase again between coke oven gas and duo-gas for an increase in heating value. This discrepancy, however, will disappear as soon as the heat contents of the waste gases are taken into account. These are:

For producer gas, 67.39 B.t.u. per cu. ft., with a flame temperature of 2673 deg. Fahr.  
For natural gas, 86.84 B.t.u. per cu. ft., with a flame temperature of 3226 deg. Fahr.  
For coke oven gas, 89.38 B.t.u. per cu. ft., with a flame temperature of 3302 deg. Fahr.  
For duo-gas, 95.80 B.t.u. per cu. ft., with a flame temperature of 3400 deg. Fahr.

This shows a steady increase in the flame temperature, with an increase in the heat contents of the waste gases, and it illustrates again the interrelation between flame temperature and volume of waste gases or product of combustion. Fig. 2 shows a curve plotted from data obtained from investigating a

number of natural and artificial gases; it gives the theoretical flame temperature in relation to the heat contents of the waste gases for dry gases, burnt with the theoretically required amount of air, gas and air being cold.

A glance at Fig. 1 makes readily apparent the reason why natural gas with a heating value of 1018 B.t.u. per cu. ft. has a flame temperature nearly 200 deg. Fahr. below that of duo-gas with a heat value of 426 B.t.u. per cu. ft., and nearly 100 deg. Fahr. below that of coke oven gas with a heating value of 425 B.t.u. per cu. ft. There are two reasons for this condition. The first is the large amount of ballast in the form of nitrogen, which is brought along by the 10.64 cu. ft. of air required for combustion; the second reason is due to the hydrocarbons in the original gas which, when burning, form carbon dioxide and water vapors in larger quantities than in any of the other gases in question.

Both these waste gases have a much higher specific heat than nitrogen. A large amount of heat developed during combustion is, therefore, consumed to heat up these waste products to furnace temperature and is, for this reason, made useless for furnace purposes or furnace work. The ratio of the combustible matter to the ballast (not counting the oxygen) is, in natural gas, 1 to 8.46. Coke oven gas and duo-gas, on the other hand, require less than half this amount of air. They form proportionally less carbon dioxide and water vapor and the heat thus saved can be used for doing effective furnace work. The ratio between combustibles and ballast is here 1 to 3.90 and 1 to 3.25 respectively. Producer gas, finally, being a very lean gas with a ratio of 1 to 4.16, cannot develop enough heat to generate the required temperature without the use of regenerators, in which gas and air have to be pre-heated to a certain degree.

Under operating conditions another disadvantage will make itself shown which, however, cannot be prevented. That is the impossibility of mixing, by natural means, the amount of air required for the combustion of 1 cu. ft. of natural gas with this cubic foot of the gas, to obtain complete and perfect combustion. There is no burner on the market which will mix more than 5 or 5.5 cu. ft. of air with 1 cu. ft. of gas in such a way that complete and perfect combustion will be obtained. Coke oven gas and duo-gas have, therefore, a decided advantage over natural gas, because the air required is only 4.045 and 3.84 cu. ft. respectively. These quantities can easily be mixed and will give good combustion.

The impossibility of mixing, by natural means, more than 5 or 5.5 cu. ft. of air with one cubic foot of gas can easily be proved when a complete analysis of the waste gases is made in a natural gas fired furnace. In most cases those analyses are made with an ordinary Orsat apparatus, giving carbon dioxide, oxygen and carbon monoxide. The rest is considered to be nitrogen. But I have had a good many complete waste gas analyses made, and have found as high as 15 per cent hydrogen and 3 to 5 per cent methane, indicating imperfect combustion on account of an imperfect mixture

of the gas and the air. Such a condition, of course, will only make matters worse.

It was said before that duo-gas is among the fuel gases which are of importance for the steel industry. In many instances where natural gas is giving out, the factory manager will not be satisfied until he finds a substitute which will do the work in the same way as

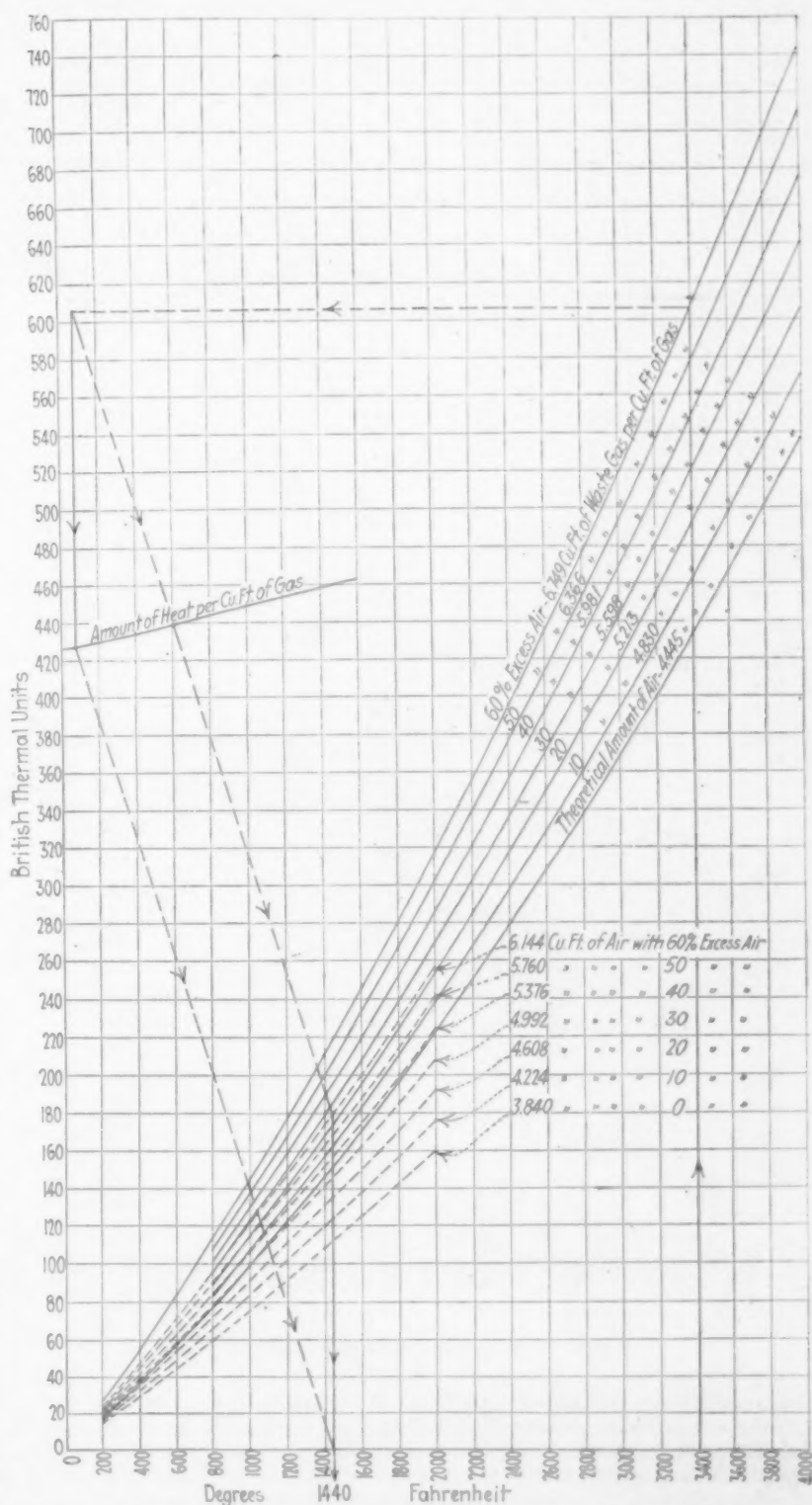


Fig. 4. Combustion Curves for Duo-Gas (Combination Coal and Water Gas)

natural gas. In galvanizing plants, steel mills, welding plants and forge plants, for instance, raw producer gas cannot be used and clean producer gas will not do the work at all, or only under exasperating conditions. In such cases duo-gas is the right fuel to be applied.

Or there may be a by-product plant, furnishing coke for the blast furnaces and gas for the open-hearth and other furnaces. The coke plant may furnish enough coke but not enough gas. There, again, duo-gas will fill the want. It has the same heating value as coke oven gas and can easily be mixed with it, giving a



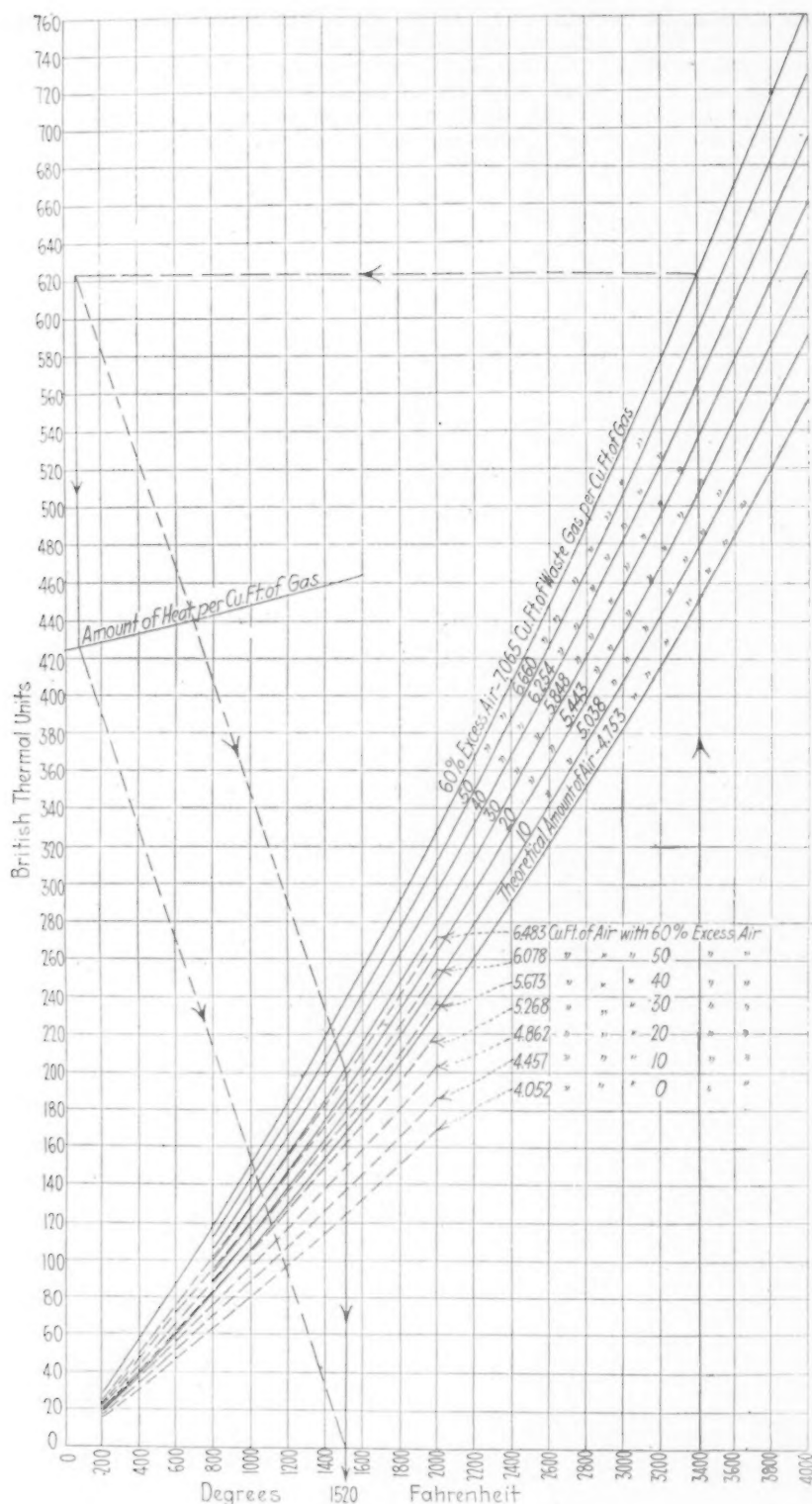


Fig. 5. Combustion Curves for Coke Oven Gas

flame temperature high enough to do any work in the steel plant, without the use of 5 or 6-ft. flues or of gas regenerating chambers. Besides, an installation of duo-gas machines requires little space and not much labor.

What is now the actual equivalent value of the different gases? If the judgment is based on the heating value, the equivalents will be (using the heating values as given in Fig. 1 and in Table I).

1 cu. ft. of natural gas = 2.40 cu. ft. of coke oven gas or = 2.40 cu. ft. of duo-gas or = 7.65 cu. ft. of producer gas.

In how far are these ratios influenced by the pyrometric efficiency? To determine this, a comparison will be made between the different gases in question, assuming a certain flame temperature, and investigating under what conditions this temperature can be obtained, when using the different gases. For this purpose four sets of curves are reproduced in Figs. 3, 4, 5 and 6.

The analyses of the gases are given in Table I. Assuming producer gas to be preheated to 1300 deg. Fahr. and the air to 1850 deg. Fahr., the theoretical flame temperature will be 3400 deg. Fahr. To obtain the same temperatures from the other gases, the air must be preheated, while the gases remain cold. These air temperatures must be (following the lines in Figs. 3, 4, 5 and 6):

For natural gas, 1640 deg. Fahr.

For coke oven gas, 1520 deg. Fahr.

For duo-gas, 1440 deg. Fahr.

There is therefore a difference of approximately 100 deg. in the air temperatures of the different gases, to obtain the same theoretical flame temperature of 3400 deg. Fahr. The figures show at the same time that, to obtain the desired temperature with natural gas, the air must be preheated 200 deg. higher than the air for duo-gas and 120 deg. higher than that for coke oven gas. This proves, again, that the heat value of a gas is not a criterion for its value of efficiency and that "a B.t.u. is not a B.t.u."

It was said above that the gases will not be preheated. The reason for this is that, if hydro-carbons are heated over 1500 deg. Fahr., they will be decomposed. Natural gas consists of practically nothing but hydrocarbons and, for this reason, preheating would be detrimental to the value of the gas. The other two gases do not contain such large quantities of hydrocarbons as natural gas; the loss under preheating would, therefore, not be so marked as with natural gas, but preheating of these gases is not necessary, because their theoretical flame temperatures are higher than that of natural gas. Producer gas, of course, must be preheated, for the reasons given above.

These conditions naturally influence the actual equivalent values of the different gases and change them completely.

Table II, "Equivalent Gas and Heat Values for the Same Flame Temperature," (page 451) gives these ratios for theoretical conditions, combustion taking place with 60 per cent excess air. It can be seen that, when comparing the heating values of the gases directly, 3.2 cu. ft. of producer gas, 0.42 cu. ft. of natural gas and 1 cu. ft. of coke

oven gas are equivalent to 1 cu. ft. of duo-gas. Here 1 B.t.u. is equal to 1 B.t.u. But if the furnace heats and the pyrometric efficiencies are taken into consideration, conditions will become different. Then, 2.3 cu. ft. of producer gas, 0.38 cu. ft. of natural gas and 0.93 cu. ft. of coke oven gas are equivalent to 1 cu. ft. of duo-gas and the corresponding heat values are:

For producer gas, 306 B.t.u. per cu. ft.

For natural gas, 367 B.t.u. per cu. ft.

For coke oven gas, 395 B.t.u. per cu. ft.

For duo-gas, 426 B.t.u. per cu. ft.

Hence 1 B.t.u. in the form of duo-gas does as much work as 0.72 B.t.u. in the form of producer gas, 0.86 B.t.u. in the form of natural gas and 0.93 B.t.u. in the form of coke oven gas. This shows that a B.t.u. is not a B.t.u., but that the value of the B.t.u. depends upon local, or rather, furnace conditions. It will be noticed that the actual flame temperature has been taken as

being 500 deg. Fahr. below the calculated one. This difference has been found by the writer by actual tests.

That the value of the B.t.u. depends upon local or furnace conditions can easily be shown to be true. To illustrate this, Table III has been prepared which gives the same relations, but worked out for different working conditions. In this case the actual B.t.u. values are: for producer gas, 705 B.t.u. per cu. ft.; for natural gas, 509 B.t.u. per cu. ft.; for coke oven gas, 446 B.t.u. per cu. ft.; for duo-gas, 426 B.t.u. per cu. ft. or 1 B.t.u. in the form of duo-gas is equivalent to, or does the same work as, 1.65 B.t.u. in the form of producer gas, 1.20 B.t.u. in the form of natural gas and 1.05 B.t.u. in the form of coke oven gas. Again, a B.t.u. is not a B.t.u.

By building the furnace in the right way, the flame temperature of the fuel gas can be predetermined within small limits. Thus it is possible to increase the differences in the tables still more and we may, for instance, obtain an actual flame temperature for the duo or the coke oven gas of 3300 deg. Fahr. This would bring the equivalent values between these two gases to the same figures as shown on Table III, but would increase that between duo-gas and natural gas to 1 to 0.65, or 426 B.t.u. in the form of duo-gas will do the same work as 662 B.t.u. in the form of natural gas. In other words, to replace, in the case in question, natural gas by duo-gas (or coke oven gas) it is not necessary to supply

— = 2.40 cu. ft. of  
426  
the new fuel gas for every cu. ft. of  
662  
the old fuel gas, but only — = 1.56  
426  
cu. ft.

What this amounts to in dollars and cents can easily be seen from the following calculation:

Suppose a factory uses 1.5 million cu. ft. of natural gas per 24 hr. for a certain purpose, paying 50c. net per 1000 cu. ft. This would amount to a fuel cost of \$750 per day. To replace this quantity by 1,500,000  $\times$  2.4 = 3.6 million cu. ft. of duo-gas, the manufacturing cost of which is less than 20c. per 1000 cu. ft., would leave the fuel cost practically the same, or at \$720 per day. But taking the other equivalent or 1,500,000  $\times$  1.56 = 2.35 million cu. ft., will reduce the cost to \$470, or saving of \$280 per day. Such a saving in the fuel cost would pay for the plant in a comparatively short time.

When formula (1) was derived above, it was assumed, to simplify matters, that the velocity of the gases was the same in all cases. But when rebuilding a furnace for a new gaseous fuel, it can be built in such a way that the new gas passes with a higher velocity over the bath. Since the heat transmission from the flame to the bath is directly proportional, not only to the temperature difference and the quantity of waste gases, but also to the velocity of travel of the gases, the furnace can be designed in such a way that the areas of the ports can be varied to suit conditions, and a velocity of twice that of the old gas may easily be obtained. The temperature difference of the coke oven gas and the duo-gas would then be equivalent to twice

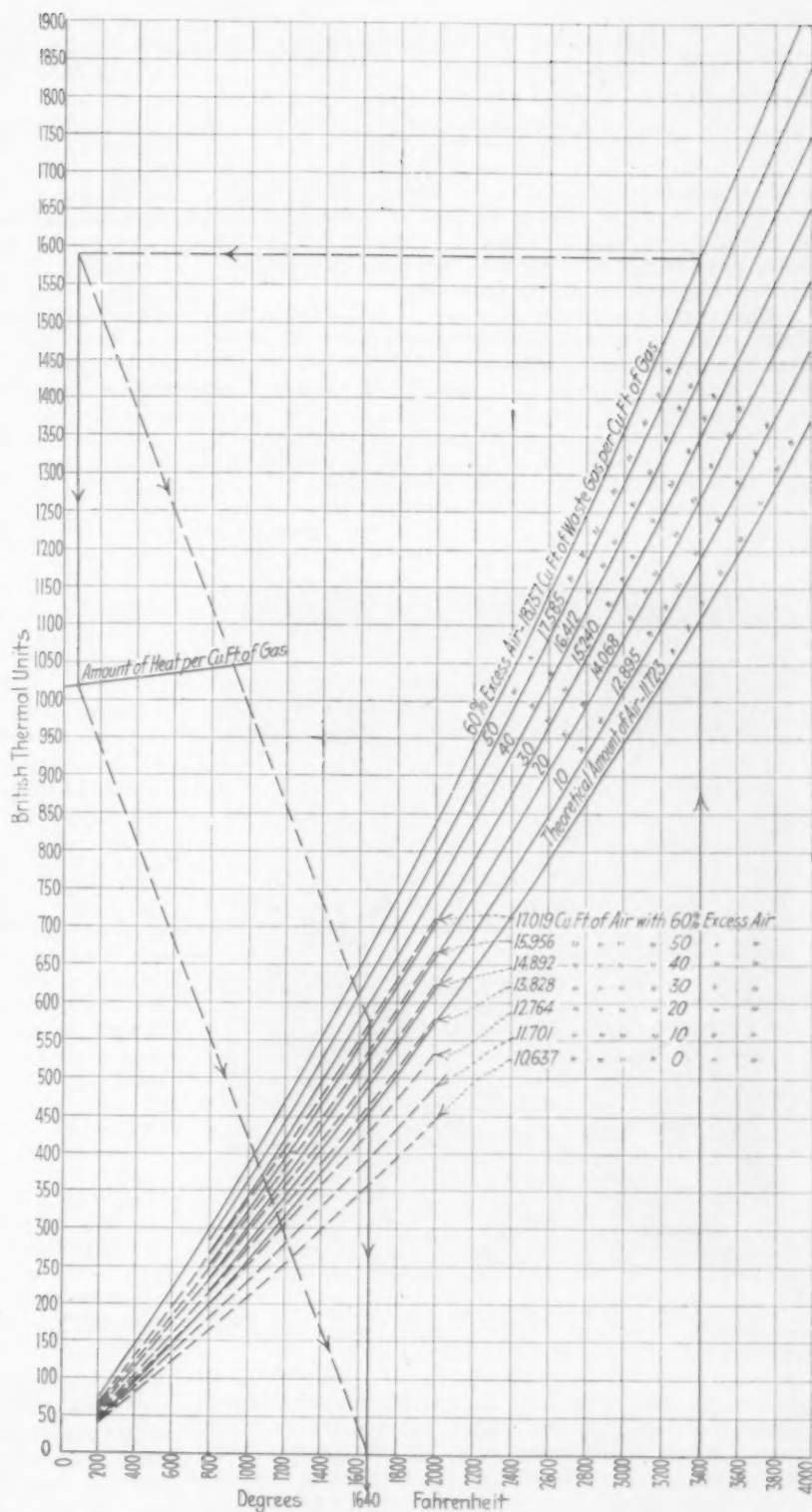


Fig. 6. Combustion Curves for Natural Gas

the value given in Table III, whereas the difference for natural gas, for instance, would remain the same. The final result would be: 1 cu. ft. of coke oven gas or duo-gas is equivalent to 1 cu. ft. of natural gas and 1 B.t.u. in the form of the two first named gases does as much work as 2.4 B.t.u. in the form of natural gas. Again, a B.t.u. is not a B.t.u.

Such conditions have been found to prevail under actual working conditions. In Europe, where there is no natural gas in the districts where the steel industries are located, it has been found that, when compared with producer gas, coke oven gas is much more efficient and economical than raw producer gas. This could not be the case, if it were necessary to replace one gas by the other according to heat values. In the United States, direct comparisons of the equivalent quantities

(Concluded on page 451)



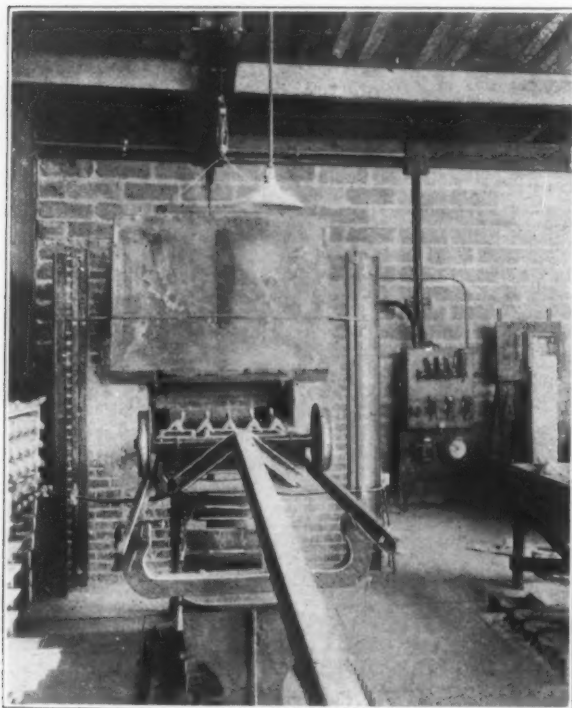
## BAKING ENAMEL

### Electric Furnace Used for Castings and Sheet Metal —Operating Features Outlined

For baking vitreous enamel on cast iron stove parts and on sheet metal, the Galusha Stove Co., Rochester, N. Y., employs the electrically heated furnace shown in the accompanying illustration, which in addition to features of design is of interest because of some of the factors connected with its operation.

The furnace operates at from 1200 to 1400 deg. Fahr., with a maximum temperature range of 2000 deg. Fahr., and has a connected load of 118 kw. at 230 volts, 3 phase, 60 cycles. Its capacity is estimated at approximately 7 lb. of metal per kwhr.

The two classes of material require for their baking two temperature settings, and durations of baking, the cast iron parts being baked at a temperature of 1250 deg. Fahr. for 9 min., and the sheet steel at 1400 deg. for 4 min. The company buys power from the central



Electric Vitreous Enamel Furnace Installation. Spraying equipment is in the same room and sprayed parts are assembled on trucks near the oven

station on what is known as a three rate schedule, whereby power used at a steady demand for 24 hr. a day earns the lowest power rate. A schedule has been worked out for the operation of the furnace so that its running periods are dove-tailed with those of the other power using devices in the foundry of the plant, so that no additional demand is created during the daytime. By this method the operating expenses of the furnace itself are held to a very low level, and by not running the furnace in peak hours through the winter months, further economy has been effected. In addition to the factors outlined, economical operation is further attributed to the speed with which the material is finished, and the reduced attendance necessary.

The percentage of rejects from the electric furnace is said to be only about 4 per cent by weight of all the material baked, which is considered noteworthy in this case, because a large proportion of the work baked is enameled in white or light gray, colors that are very susceptible to spoilage from a contaminated atmosphere, either in the furnace itself, or in the neighborhood.

Space and time have been saved in this case by installing the spraying equipment in the same room with the furnace, and to assemble the sprayed parts on trucks to be baked, where they are left until their turn

comes, in close proximity to the furnace. The furnace is operated by men who previously had little or no experience either with electric furnaces, or with enameling itself.

The equipment consists of the furnace proper and the automatic control panel and instrument. The furnace is constructed of brick, with a refractory lining, and having a sliding door that gives access to the upper compartment from the front. The dimensions of the overall working space are 5 ft. deep x 3½ ft. wide x 23 in. high. The interior is divided horizontally into two compartments by narrow shelves on each side wall, which support the sides of the tray on which the work to be baked is set. Nickel chromium heat units are mounted away from the side walls, and are distributed about evenly between the upper and lower compartments. This arrangement, together with the curved roof, is intended to cause the heat to strike the charge from all directions, and permit of uniform heat distribution throughout the furnace interior. The temperature is automatically controlled by a Leeds & Northrup Co. instrument and an automatic control panel carrying contactors and overload relays. The heating elements and the control panel are of General Electric Co. manufacture.

### Coke Production Increases

UNIONTOWN, PA., Feb. 3.—Coke production in the Connellsville bituminous region continues its consistent gain, car placements for coke operations having continued favorably during the week. Output for the week was 245,690 tons, a gain of 11,010 tons over the preceding week. The average production for the first four weeks of the year was 231,145 tons as compared with an average production of 86,735 tons for the first four weeks of 1922. If the present ratio is maintained, the production for the year will aggregate approximately 12,000,000 tons, a greater total than any year since 1916 when the production was 16,138,590 tons. Coke car placements on the Monongahela and Pennsylvania railroads, which handle the bulk of the coke business in the region, averaged around 80 per cent during the week. Additional ovens to the number of 506 were put in operation during the week, 154 at furnace and 352 at merchant operations.

Coal output is less satisfactory due to a car supply which is not exceeding 10 per cent for the region. Coke prices remain firm, but coal prices are softening, despite the small car supply.

The strikers still are showing their resentment and many of them are seeking their old places at the various operations in the county. When taken back, however, they return to work on the basis of new employees.

### Steel Corporation's Accident Prevention

In the United States Steel Corporation bulletin No. 9 issued by its Bureau of Safety, Sanitation and Welfare, there is shown a decrease in the accident rate for 1922 of 56.13 per cent as compared with injuries in 1906 on a scale of 1000 employees. This figure is 3 per cent lower than for 1921 and represents nearly 3000 individuals saved from serious injury. The number of serious injuries has been constantly diminished since 1906, the only notable interruption coming in the war period when production was so greatly accelerated. During 16 years, the total number of employees saved from serious injury is 35,313.

### Electric Power Club to Meet in June

The next annual meeting of the Electric Power Club will be held June 11 to 14, inclusive, at the Homestead, Hot Springs, Va., where the association was organized in 1908. It is expected that important standardization of electric power apparatus will be effected at the meeting, because the new edition of the Electric Power Club Handbook will be published soon thereafter, and the different sections of the club are working to accomplish as much as possible to get the work into the new handbook.



# To Test Flexible Provisions of Tariff Law

## Fordney-McCumber Plan of Adjusting Rates Found Difficult to Work Out—Larger Appropriations for Investigations Needed

BY L. W. MOFFETT

WASHINGTON, Feb. 6.—Test of the practicability of the flexible provisions of the Fordney-McCumber tariff act is about to be made. This plan of adjusting duties on imports is an entirely new departure in the history of the United States Government. Its incorporation in the new law was made at the insistence of President Harding himself. It has been generally accepted as affording an agency for scientific tariff making because duties under it, within certain limits and under certain conditions, can be adjusted to changing economic conditions throughout the world.

Admittedly, however, it is not known how satisfactorily the provisions may work and because of this, particular interest is being manifested in hearings that will be held on applications made under the flexible section to reduce or increase import duties. At the same time, study of the provisions has revealed the fact that they will have to be amended in some respects before they are perfected. This has been pointed out by Edward P. Costigan of the United States Tariff Commission and has been recognized generally by those who have kept in touch with developments since the new law became operative and under which, it is said, 100 applications for changes in rates have been made.

### French Refuse Information

An instance of a difficulty in applying the flexible provisions in their entirety is the recent refusal of French manufacturers to divulge the cost of production of French products exported to the United States and which compete with American products. It has been pointed out that if no way is found to get this information it will be virtually impossible to carry out the law providing that rates of duty may be readjusted to equal the difference in the cost of production at home and abroad.

Some time ago, the commission sent two agents to Europe assigned to France, Belgium and Switzerland to obtain preliminary data to be used in the price of applications for changes in rates. They had hardly begun work in France when they were met with one refusal after another with regard to information about French production costs, and it has been indicated that the attitude of the French manufacturers may be followed by manufacturers in other foreign countries on the general ground that the diversity of conditions within any industry is such that investigations of this character could not give results of practical utility, the attitude taken by the principal speaker for the French manufacturers, M. Lewis Pommery.

The tariff act, of course, carries stern provisions of retaliatory character by which imports from countries where information of this kind is denied could actually be prohibited. But it is evident that the United States Government does not desire to resort to the use of such severe terms unless there should be much more serious provocation than is anticipated at this time.

### Serious Lack of Funds

As is well known also, the Tariff Commission is handicapped by a lack of funds to carry on extensive investigations in the United States and foreign countries. Chairman Thomas O. Marvin of the commission said that since the commission has only \$150,000 addi-

tional funds to carry on the work until the end of the current fiscal year, June 30, the investigations will not be elaborate. The commission also was unable to persuade the Bureau of the Budget and Congress of the necessity of the \$1,000,000 appropriation it sought for the fiscal year ending June 30, 1924. Instead the Bureau of the Budget pared this sum down to \$700,000, which was allowed by Congress. It is stated that this means the investigations under the flexible provisions will not be so elaborate as the commission had hoped.

There appear, however, to be two schools of thought with respect to the intent of the flexible provisions. Under one of them, much more extensive investigations would be required than under the other. It is the opinion of one school, referred to as a low tariff element, that the flexible provisions are meant to be used for gradual and complete readjustment of the tariff, on a so-called scientific basis, following careful investigations. This policy put into effect, actually would take the tariff out of politics, or at least virtually out of the hands of Congress except, of course, the latter still would exercise a control through the power of appropriation.

### The Protectionist View

The other school of thought, the so-called protectionist group, adheres to the idea that the intent of the flexible provisions is to meet emergency and changed economic conditions only. It seems altogether likely that in view of the adoption of the flexible provisions under a Republican Administration headed by President Harding, the latter idea more nearly represents the intent of the new tariff legislation. The fact is not to be overlooked, though, that the public generally is strongly in favor of the tariff being removed so far as possible from politics. This is a factor that undoubtedly has to be taken into consideration and it conceivably possesses the power to confer increasing authority upon the Tariff Commission and ultimately to constitute it as a tariff rate making body and not merely as a body that can recommend rates.

Under the flexible provisions, as they now stand, the President actually is empowered to establish rates upon the recommendation of the commission. But as sweeping as the President's authority is under the flexible provisions, it is far from being so far-reaching as would be the case if the commission itself could either adopt rates or recommend rates throughout, or establish duties where there are none or remove dutiable articles to the free list. There unquestionably is sentiment in the country in favor of giving the commission authority of this kind.

### Hearing of Applications

The first hearings on applications under the flexible tariff provisions will not be held until after the present session of Congress adjourns. No announcement of the schedule of hearings has been made but it is the belief that the number of applications for hearings granted has been extremely small when compared with the total number of applications made. It is believed that the commission will announce hearings on only such applications as have been granted and will make no announcement regarding applications that were denied.

Among applications that have been contemplated and which may actually have been made, although the commission is not at liberty to announce the fact, is one asking for an increase in the duty on pig iron. The present duty is 75c. per ton. A 50 per cent increase, which is said to have been sought, or at least contemplated, would be 37½c., so that if the increase were made it would bring the duty to \$1.12½ per ton, which merchant blast furnace interests think would not be sufficient as a protective measure, and would act only as a revenue producer, which is the purpose of the present duty. Nothing has been announced as to

whether applications have been made by representatives of the steel industry for reductions in rates on manganese ore and ferromanganese which particularly have been the object of vigorous protest by consumers.

The New York office of the Tariff Commission has been opened at room 503 Customs House in charge of Frederic L. Koch. It is understood that the office for the present will engage chiefly in conducting investigations for the Washington office, compiling data with regard to work of the commission and keeping in touch with developments of the New York port relating to the administration of customs regulations and laws.

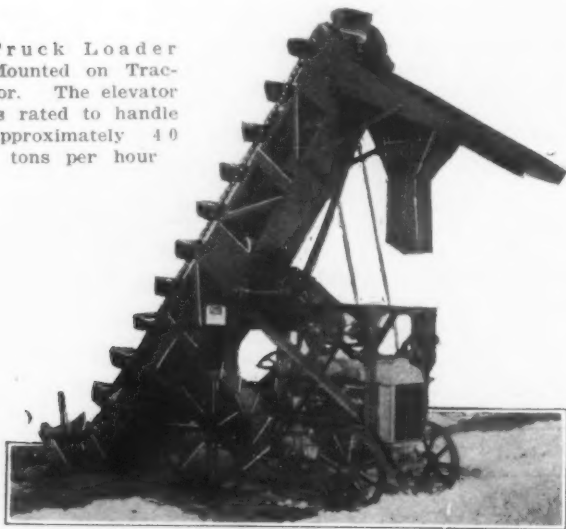
### Truck Loader Mounted on Tractor

A truck loading elevator mounted on a Fordson tractor, as illustrated, has been brought out by the George Haiss Mfg. Co., Inc., 365 Rider Avenue, New York. This equipment is intended primarily for use in loading trucks or unloading bottom cars at various points at a distance from each other.

The elevator has a capacity of approximately 40 tons per hour. It is driven from the side shaft by means of chain and sprocket to a countershaft, and a clutch has been incorporated to permit of propelling the machine without running the elevator. The operator sits on the tractor seat and controls the machine by conveniently placed levers.

The tractor has forward speeds of 2½, 5 and 8

Truck Loader Mounted on Tractor. The elevator is rated to handle approximately 40 tons per hour



miles per hour and a speed backward of about 2 miles per hour. The weight of the machine is approximately 6000 lb.

### Cast Steel Instead of Forged Anvils

A Czech engineer, in a recent article in *Stahl und Eisen*, describes experiments with the object of replacing the usual forged and welded anvils by cast steel ones, for use in smithies and lock works. It would appear that good results have been obtained and that the cast steel implement is 30 to 40 per cent cheaper. A sorbitic structure of the metal gives the best results. The steel for normal anvils, weighing one to six hundredweights, has the following composition: Carbon, 0.45 to 0.55; manganese, 0.85 to 0.90; silicon, 0.50; phosphorus, less than 0.03, and sulphur, less than 0.04 per cent. Anvils for lock-making and nail shops are occasionally made of a special steel running 0.50 carbon, 0.6 to 0.8 manganese, 0.25 silicon, 0.02 phosphorus, 0.02 sulphur, 0.3 to 0.35 chromium and 0.60 per cent nickel. The casting is done in sand.

After being cleaned, the castings are heated and worked with the object of refining the grain. The worked anvils are then ranged on a tray, the spaces between them being filled with sand, and placed in a furnace. They are then gradually heated to a temperature of 710 to 810 deg. C., according to the carbon con-

tent, and are cooled to between 600 and 615 deg. by compressed air at 2 to 5 atmospheres in the space of 6 to 8 min. By means of this treatment the requisite sorbitic structure is obtained. The temperature is of importance and is therefore regulated with optical pyrometers. After cooling to 600 deg., the castings are allowed to cool to normal temperature in air. Brinell tests on the plate gave results of 250 to 260 with the finished anvil. Sometimes the castings are given a further treatment on emery wheels. With cast steel anvils, the shape is apparently of no great importance.

### Detroit Employment Record

With 202,959 persons reported working by the 79 firms comprising the Detroit Employers' Association, employment figures have broken all records for the city and passed the high-water mark recorded in March, 1920. Officials of the association estimate that the grand total of persons working, including those employed by firms which do not report to the organization, is more than 300,000. Members report that the influx of new labor at present is of the kind that is easily absorbed. The net increase in the number employed by the association was 18,937 for the month of January, the labor barometer showing a net increase of 4333 for the week ending Jan. 30. The above figures are especially striking when compared with the low ebb total in January, 1921, when the association reported only 30,000 working, and outside firms showed a total of 15,000 employed.

### Increased Exports from Liverpool

WASHINGTON, Feb. 6.—Heavy increases in exports from Liverpool to the United States in 1922 as compared with 1921 have been reported to the Department of Commerce by Consul Horace Lee Washington, the value for the former year being \$31,607,993 as against \$14,943,795 for 1921, and are due to an important extent to the greater 1922 exports of ferromanganese, pig iron and tin bars.

In 1921, the exports of ferromanganese totaled 8094 tons, valued at \$593,044, while in 1922 they amounted to 52,754 tons, valued at \$3,283,561; exports of pig iron in 1921 were only 126 tons, valued at \$5,679, as against 82,348 tons, valued at \$1,886,450 in 1922; exports of spiegeleisen in 1922 totaled 7159 tons, valued at \$226,316, while none were declared in 1921. Tin bar exports in 1921 were 3,019,559 lb. as against 3,809,676 lb. in 1922, while tin plate exports in the former year totaled 645,398 lb. as against 1,444,335 lb. in 1922.

### Deflation in Farm Machinery Prices

A study of farm machinery prices from 1914 to 1922 as set forth in the report of the Congressional Joint Commission of Agricultural Inquiry shows that if power equipment and twine are not included there was an increase of 41 per cent over 1914 prices, and that if power equipment and twine are included in the computation, the increase amounted to less than 20 per cent.



## ROLLING MILL DEVELOPMENTS

### Trend in Motive Power in Type of Mill and in Securing Economies

BY JOSEPH F. SHADGEN

THE state of business over the last 18 months has given rolling mill operators a special incentive to meditate over reductions of operating costs and designers of equipment a chance to develop new lines of more efficient machines. Conservation of capital will inevitably push into the limelight reduced cost of installation—I am careful to avoid the words cheap cost—and economic necessity will probably work in favor of steam drives.

The unaflo reciprocating steam engine has demonstrated its flexibility by a notably flat curve of steam consumption over a wide range of loads and reliability under all operating conditions, with auxiliary valves independent of condensing equipment. These drives in conjunction with modern boilers and an efficient fuel burning method—modern stokers or pulverized coal installation—will probably enjoy a greater popularity in the near future. They will mean a revival of steam engines to a certain extent and will include all recent improvements in that art, in particular the cushioning of varying loads by adequate storage equipment. This tendency has already thrown its shadow by the construction of a large blooming mill engine for the Pittsburgh district, the first high powered engine of the unaflo type.

### Contest of the Electric Motor

This development will mean that the electric motor will have to fight its competitor—so often regarded as dead—with new improvements and greater efficiency to offset the cost consideration and the double transformation of energy inherent to its principle of providing mechanical energy. The development of large power stations supplying complete districts with cheap electricity—sold on a sliding scale with due consideration to the monthly amount of power consumed and the power factor—will not fail to add to the well known points in favor of electric drives; cleanliness, ease of regulation, exact control, instantaneous information of load and kilowatt consumption, etc.

Weakness of the cooperation between public utilities and steel plants touches the other side of the electric motor application, lying in the relatively weak guarantee against any interruption of service due to breakdown at the power house. If the electricity producers provide adequately against emergencies, to protect the continuity of service, spare and reserve units can be dispensed with at the steel plant, considerable operating and overhead charges will be saved and costs greatly reduced. There is, in short, this important problem of cooperation between two large industries that needs broadminded realization of the real meaning of mutual advantage.

The accumulated experience of late years gives reliable information for the proper choice of motor sizes, as it does also cover the influence of power factors, in the case of alternating currents. Large power supply companies in the electrical field are fully aware of the possibilities offered to them and are doing considerable educational work to ease the sale of their product.

The mechanical equipment of rolling mills will enter a period of increased standardization. Rolls and their stands, pinions and their housings, differ actually only in details, if designs of the same size are compared. The wishes and fancies of individuals have had too large an influence on design. The fact that by consistent effort one leading concern has practically standardized its smaller mills (below 24 in. diameter) may serve as an example to the rest of the industry. Recent consolidation of machine shops specializing in this work under strong leadership should favor the standardization.

Auxiliaries will play an ever increasing rôle, as they represent the labor-saving and often time-saving features of rolling mill installations. They are after all

material-handling devices of special nature; their ingenuity and diversity will doubtless increase in the near future.

### Position of the Three-High Mill

Three-high mills of the heavier diameters bid fair to lose their popularity against the advantage of modern two-high installations of the reversing type. The elasticity and economy of operation of electric reversing drives in plate and shape mills has shaken the belief of the superiority of the continuously rotating masses of the three-high drives. The heavy three-high mill is really a solution carried over from the days when the problems of the reversing drives were unsolved. But today modern steam engines and flywheel motor generator sets present such efficient solution of the direct application of power that roundabout solutions are at a disadvantage.

Closer study of the rolling process will probably create an issue between the blooming mill with tilting devices and the modern heavy universal mill. European experts always found fault with the American method of reducing the ingot section, because only two sides of the metal were rolled in the open grooves while no pressure was given in the earlier passes to the sides of the ingot. By frequent tilting any defects are corrected in alternate passes. Modern six-roll mills (two horizontal, four vertical) present an ideal solution to this difficulty because all four sides of an ingot are rolled completely in each pass and no tilting is required at all. Late designs of heavy universal mills have solved previous operating troubles. The rolling is under instant control. The positions of the horizontal and vertical rolls are set positively and changed by the operator according to the schedule of passes. For quality material the universal mill should prove particularly advantageous.

### The Case of Reheating Furnaces

The greatest developments of rolling mill practice are in the field of fuel economy and accurate temperature control, in other words, in the mill furnace design. High cost of coal, scarcity of natural gas and availability of coke oven gas have created new conditions that are to be faced. Efficiency will be the only saving grace and here lies the opportunity of the resourceful operator. Coal grates will have to disappear on account of their wastefulness and either gas fuel or powdered coal will offer advantages. Furnace designs will have to take into consideration modern theories of gas flow and the specific character of heating problems. Regenerators as well as recuperators are already coming into vogue to save the waste heat of the burnt gases and these new constructions are meeting with favor. The remarkable showing of by-product coke ovens, by keeping up their production during the shut-down period and by crowding the beehive ovens practically off the map, brought into prominence in a large number of steel plants the surplus gas as a fuel for open-hearth and other furnaces.

Accurate temperature control is of the greatest importance and will be given closer attention, as the power required for a given transformation of metal depends largely on the temperature range. The plasticity of iron is a direct function of its heat concentration, as the Puppe tests have explicitly proved.

The present year will find the rolling mill industry in a period of fertile transition, where operating economy is the password for many-sided progress toward greater efficiency. To produce more steel and better quality at less cost is the fundamental "why and what" of all the trends outlined in the foregoing and they cannot help but bear abundant fruit for the good of the whole industry.

An organization known as the Asbestos Brake Lining Association has been formed to integrate Eastern manufacturers of such products. Arnold A. Mowbray has been appointed commissioner with offices located at 17 West Forty-second Street, New York. S. S. Simpson, president, Raybestos Co., Bridgeport, Conn., announces as president that a meeting will be held next week at the Hotel McAlpin.



## NEW CASE HARDENING METHOD

### Use of Catalyzer to Facilitate Formation of Carbon Monoxide—A Swedish Invention

BY FRANK HODSON\*

A PROCESS which promises to improve considerably present methods of case hardening has recently been introduced and patented by the Swedish scientist, Dr. Assar Gronwall, who will be remembered as the inventor of the Elektrometall type of electric shaft ore smelting furnace and various other electrical processes. Doctor Gronwall showed the writer a number of examples of this new case-hardening method, and I also had the privilege of examining records of tests made by Prof. Armd Johansson of the Tekniska Hogskolan, Stockholm.

Doctor Gronwall's process is based upon the knowledge that carbonizing is due to the presence of carbon monoxide which, in the presence of iron at suitable temperatures, breaks up into carbonic acid and carbon which, together with the iron, forms carbide of iron. In order to facilitate the process it is usual to mix with the carbonaceous packing a so-called carbonizing powder, such as quartz, brick dust, carbonate of barium, metallic oxides, etc., which are supposed to facilitate the formation of carbon monoxide within the furnace. It has been fully proved, however, that even when using

\*President Electric Furnace Construction Co., Philadelphia.

the best cementing mediums, the process is unnecessarily slow and that deep carbonization is very difficult. Doctor Gronwall's experiments proved that the gases inclosed in the case hardening pots soon become saturated with carbonic acid and therefore the process gradually stops.

The new method consists of converting the carbonic acid as formed to carbon monoxide. This is done by putting catalyzers of a special metal in the form of thin sheets, ribbons or wires, into the casing box with the carbonaceous matter surrounding the material to be case hardened. The catalyzer then acts in such a way that the carbonic acid, when coming in contact with the metal, passes into carbon monoxide. An iron object may be case hardened deeper on a certain spot by placing the catalyzer there. In the case of gear wheels, they were case hardened only on the outer parts of the cogs. The catalyzer is not consumed during the operation and therefore the expense for the new method consists only of the expense of original catalyzers and the license to operate.

With the new method less carbonizing material is claimed to be needed, the temperature can be kept lower than in the usual method and the time occupied is just about half. The tests at the technical academy, Stockholm, consisted in treating pieces of steel from the same bar in an electrically heated furnace, first in the usual case hardening method and second with the addition of the catalyzer. The amount of case hardening was considerably deeper in the second samples, although time occupied, temperature and other conditions were exactly the same.

## Report of Bureau of Standards

In the annual report of the Bureau of Standards for the fiscal year 1922, covering 282 pages, 6 x 9 in., a number of important technological subjects are discussed. Among other things, the bureau lists standard samples of materials called for during the year to the number of 3532, as compared with 4016 in the previous year.

Of the total number in 1922, 2401, or more than two-thirds, consisted of metals, 2019 being irons and steels, 138 brass, bronze and bearing metals, and 244 miscellaneous metals for determination of melting points. In addition, there were 184 samples of ores and nearly 1000 samples of miscellaneous materials. The decrease in the number of standard samples issued was attributed in large part to the depression in industry, particularly in iron and steel.

Much work was carried on during the year in the testing of materials and structures. Designs of columns and compression members in steel buildings and bridges have been investigated, it being felt that our knowledge of such members is in a far less satisfactory state than the design of tension members or girders.

### Testing for Fatigue of Metals

Four machines have been built for testing materials for flexural fatigue and work has been carried on along this line during the year. A number of machines for testing impact fatigue have been developed and are also in use. These are arranged so that both the height of the fall and the weight of the hammer may be varied to suit conditions.

Investigations have been made of the axial compressive loads which will cause failure of the steel tubing used for airplanes. Tubes of different diameters, thicknesses and lengths have been tested and the results compared both with other experimental work and with theory.

In an attempt to secure harder balls for hardness testing by the Brinell method, for use when the metal being tested is of more than 500 hardness, tungsten carbide has been secured and its suitability for this purpose studied. Although it appears to have some advantages, the samples so far obtained have not been satisfactory. The balls customarily used are deformed

on striking very hard materials and the hardness, therefore, not accurately determined.

### Re-rolled Steel for Reinforcing

As concrete reinforcement made from salvaged material, usually old rails, is prohibited in nearly all public and private work, an investigation was made to determine the suitability of such reinforcement. One of the main objections against re-rolled steel is that there is much breaking in handling. The tests, therefore, were designed to show brittleness, lack of ductility and tensile strength. Except for one lot, the re-rolled steel tested showed tensile strengths which met the A. S. T. M. specifications. Only one lot failed to meet the bend test. The impact test was sufficiently severe to stress the bars well beyond their yield points. None of the bars, however, broke under this test, although all showed a decided bend.

From the tests made it appeared that either re-rolled or new billet steel with yield points up to 60,000 lb. per sq. in., which meets the tension and bend tests, would be satisfactory for concrete reinforcement. From the tests it appears doubtful if re-rolled steel with yield point above 60,000 lb. can be bent to meet conditions in practice. Reinforcement not required to be bent, however, should be satisfactory if it meets the tension test and suitable impact or bending tests to detect brittleness.

The Merchants' Despatch Transportation Co., Rochester, N. Y., manufacturer of refrigerator cars and steel freight cars, is reported to have increased its working force from 876 to nearly 1500 during 1922, and by May 1 will have added 500 more, according to L. S. West, vice-president and general manager. Three railroad companies alone have 2000 cars on the company's order book, and in order to keep abreast increasing demand 83,600 sq. ft. will be added and equipped with machinery for turning out steel cars. This equipment will include a battery of hydraulic presses served by continuous furnaces, cooling beds, and machinery for handling steel sheets. Mr. West said that the new shop will be able to complete a steel car every 20 minutes. In addition to its production of new cars the company maintains also an extensive repair shop.

# Improving Rolling Mill Practice\*

## Use of Direct Current Electric Motors for Main Roll Drives Permits Proper Speed Regulation to Suit Steel Being Rolled

BY G. E. STOLTZ†

**S**ELECTION of the speed to operate any given mill is an important item, as it affects not only the tonnage output of the mill, but the character of the finished product. The percentage of mills driven by adjustable speed motors is continually increasing. This is due to the fact that on each mill it is generally desirable to roll a large variety of sizes and also steels of different physical properties and chemical analysis [both of which call for variations in mill speed].

The following are some of the items that must be considered in the selection of the speed at which the mill is to be operated:

1. The motor speed should be below that value at which the rolls refuse to bite the steel promptly.
2. The speed must be limited on mills where the metal is handled by hand, so that the men can comfortably catch the metal.
3. The speed of the mill must be slow enough to prevent the steel from slipping in the pass.
4. It is desirable to limit the speed to a value which will allow the steel to spread sufficiently to fill the pass.
5. The speeds of individual stands or trains on mills where the metal is looped from one stand to another must be such as to maintain the proper length of metal between passes.

### Proper Entering Speed

If the billet is small in comparison with the diameter of the rolls, the speed is seldom fixed by this limitation; but as the relative size of the billet becomes larger there is a tendency for the billet to bump against the rolls rather than enter.

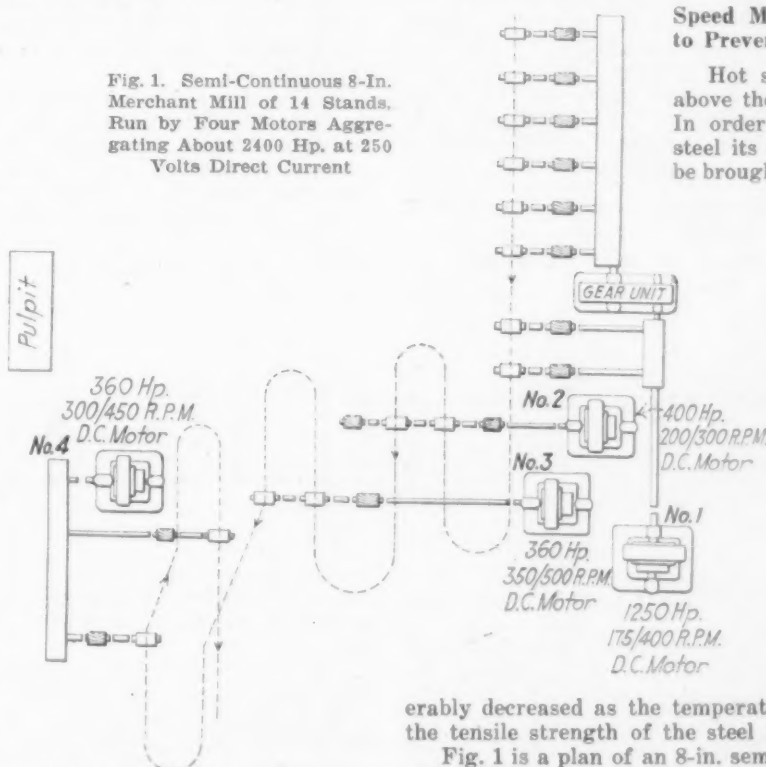
If the speed of the rolls is high, there is a tendency for the surface of the rolls to pass the edges of the metal; but if the rolls are brought down to a slower speed any irregularities in the surface will tend to grip the corners of the billet and cause the piece to enter. The corner of the billet is more likely to find its way into any irregularities in the surface of the roll if the latter is turning over at a slow speed.

### Speed Must Permit Men to Catch the Steel

On mills where catchers are used to pass metal from one stand to another the delivery speed is often fixed

by ability of the men to catch the steel. When rolling hand rounds, where the men hold the billets in position during the pass, a delivery speed of approximately 300 ft. per minute is common. On guide mills, as the size of the material handled becomes smaller, the speed of delivery can be increased, and on mills rolling No. 5 rod the catcher on the last stand handles metal being delivered at from 1000 to 1350 ft. a minute.

Fig. 1. Semi-Continuous 8-In. Merchant Mill of 14 Stands. Run by Four Motors Aggregating About 2400 Hp. at 250 Volts Direct Current



### Speed Must Be Slow Enough to Prevent Slipping in the Pass

Hot steel is usually rolled above the critical temperature. In order not to overheat the steel its temperature must not be brought too near the melting point and, as alloys are added to soft steel, the melting temperature decreases so that these steels must be rolled at a lower temperature. At the same time, as alloys are introduced, the critical temperature of the steel rises, so that the range in which steel can be rolled becomes smaller. The metal is deformed in making a pass and ability to flow is consid-

erably decreased as the temperature is lowered and as the tensile strength of the steel is increased.

Fig. 1 is a plan of an 8-in. semi-continuous merchant mill driven by four d.c. adjustable speed constant power motors. Power is supplied to these motors at 250 volts d.c. by two 1000-kw. rotary converters, which step down the a.c. power from 11,000 volts by means of transformers. In a pulpit located near the finishing train an operator starts, stops, reverses and adjusts the speed of all the individual motors on the mill. The entire speed range on these motors is obtained by field control.

Fig. 2 is a speed chart taken on No. 2 motor of this mill. This motor is compound wound and drops in speed quite appreciably as load comes on. The right hand part of this chart was taken when rolling 3½ per cent nickel steel. The light load speed is shown as 232 r.p.m. and the full load speed 220 r.p.m. When this heat of 3½ per cent nickel steel was finished they began without interruption to roll billets of 1½ per cent nickel. The speed of the motors was raised as is shown in the chart. The light load speed for the 1½ per cent nickel steel is 260 r.p.m. and full load speed 240 r.p.m. No change was made in the pass and the size of the finished product was the same in both cases.

This brings out the advantage of having adjustable equipment where steels differing in chemical composition and physical properties are rolled. The only reason for not rolling the 3½ per cent nickel steel at the higher speed was to prevent it from slipping in the rolls. While this test was made it was noticed the 3½ per cent nickel steel slipped in the second pass of the roughing train and, although the roughing mill motor

\*Abstract of paper read before Association of Iron and Steel Electrical Engineers.

†General engineer Westinghouse Electric & Mfg. Co., East Pittsburgh.



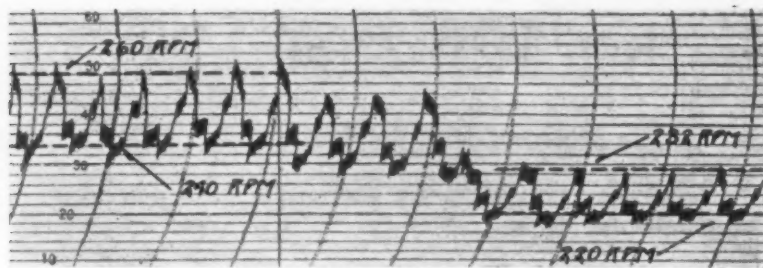


Fig. 2. Speed Diagram Taken on No. 2 Motor of the Mill Shown in Plan in Fig. 1. This indicates the necessity of rolling high alloy steel at slow speed

was increased in speed in proportion to that shown on the chart, no slippage was noticed in this stand when rolling  $1\frac{1}{2}$  per cent nickel steel. The difference in performance of the two steels may not have been entirely due to the difference in nickel content, as the  $3\frac{1}{2}$  per cent nickel steel may have had other hardening ingredients which were not used in the  $1\frac{1}{2}$  per cent nickel steel.

On a 9-in. 4-stand single train merchant mill driven by an a.c. adjustable speed set and a separate roughing stand, it has been found possible to roll common open-hearth steel having a sulphur content of 0.05 per cent or less to 0.74-in. round at 274 r.p.m. When the same size product is rolled in the same passes for bolt stock, where the sulphur varies from 0.075 to 0.095 per cent, to prevent the metal from slipping, it has been found that the mill speed must not exceed 250 r.p.m.

#### Speed Must Be Slow Enough to Allow the Steel to Fill Pass

If there is any tendency to cause the steel to exceed its natural rate of flow, it will slip or tear. The

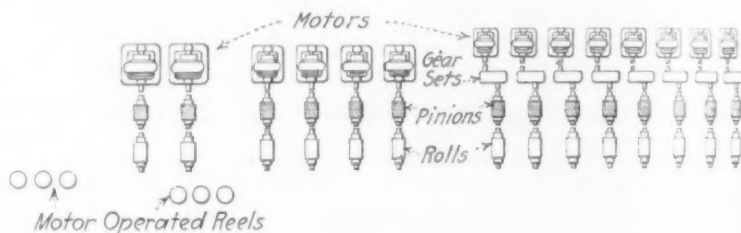
requires frequent roll changes, which naturally is undesirable.

#### Motor Speed Adjusted to Maintain Proper Loop

The problem of maintaining the proper loop between passes depends on the delivery speed of the metal and the arrangement of the mill. On a mill as shown in Fig. 1 the loop can grow or gradually become smaller within a wide range, so that the problem is not so difficult. This particular mill is driven by d.c. motors, but it can be just as well operated by a.c. adjustable speed steps, so far as operating characteristics are concerned.

If the mill as shown in Fig. 1 was laid out somewhat similarly to that shown in Fig. 3, many advantages would be obtained, but the problem of maintaining the proper loop between stands is of much higher order than that on mills to which we have previously referred. The stands are close together and the variation permitted in the loop is comparatively small. For this reason it is necessary to provide motors whose speed can be adjusted over a fairly wide range and the regu-

Fig. 3. Eight-Inch Tandem Merchant Mill of 14 Stands, with an Individual Motor Drive for Each Stand



physical contour of some sections must be more carefully filled out than others.

The failure to spread properly in a pass sometimes makes it difficult to keep the piece from turning. In one instance, when rolling nickel steel into 3 x 3-in. billets on a 14-in. single speed roughing mill, the metal did not properly fill the pass and occasionally trouble was experienced with the piece turning. The heat following this steel was a chrome vanadium alloy. No changes were made in the passes and the speed of the mill remained the same as for nickel steel. It was

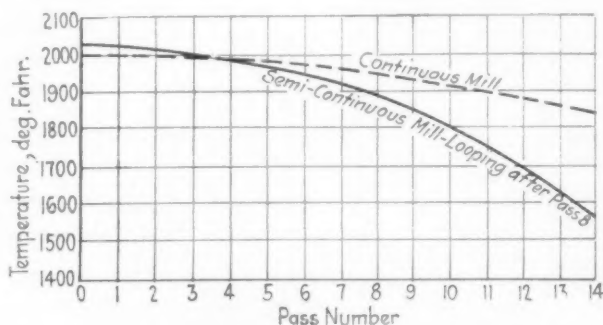


Fig. 4. Temperature Curves, Showing Drop in Temperature as the Steel Is Elongated and Rolled Down to the Final  $\frac{1}{4}$ -In. Round. The lack of uniformity in temperature on the looping mill is marked

found that chrome vanadium steel was more plastic and the passes were filled more fully, so that no trouble was obtained due to turning of the metal in the pass. In many cases slipping may accompany troubles due to not properly filling the pass. Many of these troubles can be avoided by changing the roll design, but this

lation of each motor over this entire range must be such that its speed is appreciably modified by any change in load.

There is considerable loss of temperature during the latter passes on a mill as shown in Fig. 1, when the finished section is small. Fig. 4 is a temperature chart, the full line showing the fall in temperature obtained from pass to pass while rolling the small rounds on the mill shown in Fig. 1. It will be noted that as the metal is looped out over the floor the temperature falls quite rapidly. The dash line gives the temperature per pass on a mill similar to that shown in Fig. 3.

Decreasing the temperature at which the metal is rolled gradually increases the power requirements. Tests were made on a bar mill to determine the relation between power requirements and temperature and the results are given in Fig. 5. All temperatures were taken as the metal entered the last pass. A reading was first obtained on a billet which was brought through the mill without any delay. The next reading was obtained by holding the piece before the last pass for a short period and further readings obtained by increasing this delay. It will be noted that the power required to roll the steel at 1700 deg. is over three times that required at 2100 deg.

#### Delays Affect Temperatures

While testing the mill shown in Fig. 1 it was noticed that an appreciable increase in the power demand took place after the mill had been in continuous operation for a period of an hour or more. Any delays on the mill would permit the furnace to bring the steel to a higher temperature, but as the mill was again placed in operation, the billets did not remain in the furnaces so long and the steel was rolled at a lower temperature. Immediately after the mill had been placed in operation following a rather lengthy delay, the temperature of the metal as it entered the first stand driven



by No. 2 motor averaged 2065 deg. The power demand on this motor with the mill full was represented by a scale reading of 60. One hour after the mill had been in operation the temperature of steel entering the No. 2 mill dropped to 1945 deg. and the power demand was represented by scale rating of 75. This represents an increase of 25 per cent in the load on the motor. Fig. 5 shows that the power required to roll steel at 1945 deg. is 20 per cent greater than that required at 2065

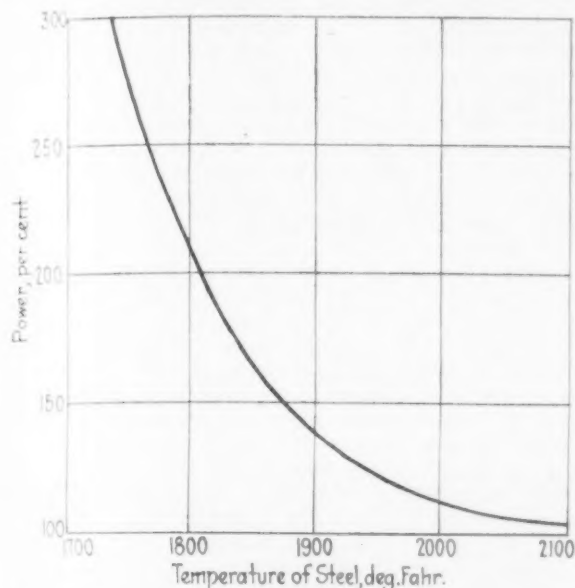


Fig. 5. Power Curve, Showing Increase in Power Requirement for Rolling as the Temperature Decreases

deg. Under these conditions it is difficult to maintain uniform section. These two instances bring out clearly the importance of having adequate furnace capacity so that the steel can be rolled at its proper temperature.

The increase in power required to roll steel on the mill as shown in Fig. 1, due to the drop in temperature shown on Fig. 4 is quite considerable. This, however, applies only where small merchant rod or flat sections are rolled. Larger sections naturally do not dissipate their heat so rapidly. On a large blooming mill rolling 22 x 24 in. ingots to 6 x 6 in. blooms a total average temperature drop of 125 deg. was noted. The method of manipulating a piece of this size is not very important as far as temperature drop is concerned.

The advantage of a mill as shown in Fig. 3 is due to its great flexibility and the possibility of maintaining a reasonable temperature during the entire rolling period. The difference in temperature between the first pass and the last pass is small, so that the product rolled on the mill can be completed within rather a small temperature range. If it is desired to finish the steel fairly close to the critical temperature the furnace can be operated at a lower temperature. This mill is well adapted to rolling alloy steel, where the rolling temperature range is small. Better control is obtained over the temperatures at which all passes are made, so that a better section can be insured.

#### Individual Motors

The use of individual motors on all stands may seem to be a radical and expensive step, but the gearing is simplified and mill friction is reduced. The motors driving each stand on a mill similar to that shown on Fig. 3, rolling small rounds, are of the order of 200 hp. There are a number of mills where the finishing trains are driven by individual motors, but the roughing stands are operated by one large motor. On some mills where the bar must clear the passes in order to turn at 90 deg. no great advantage is obtained by placing individual motors on the first stands, but where the roughing passes can be brought close together and the metal worked in practically all the passes simultaneously, individual drive throughout forms a very flexible arrangement.

Fig. 6 shows two sets of curves on a machine having poor regulation. The top curve shows the motor

operating at 1000 r.p.m. with no load. Load is suddenly thrown on and it will be noted that the motor drops its speed to 90 per cent of the no-load speed. This same machine was placed in operation with an automatic regulator; load was suddenly thrown on the motor and it will be noted that the speed dropped 4½ per cent for a fraction of a second. The regulator then came into operation and immediately brought the motor back to its no-load speed. This drop in speed as the load is suddenly thrown on the motor is a very desirable characteristic, as it will throw a small loop in the metal and retain this loop during the entire pass. With this arrangement a small amount of slack would be obtained between individual passes which would avoid pulling and also would not result in the accumulation of a loop which would be great enough to give trouble. With a regulator in practical operation which has complete control of a motor with poor speed characteristics, the combination of a compensated motor with this automatic regulator makes available apparatus which will permit a new program for the rolling of steels of small section.

#### DISCUSSION

**I. W. Keener:**\*—One thing we have found, when we went from Bessemer to open-hearth in the manufacture of rails, was slippage, even when running at same speed and for same section. We found, carbon for carbon, or the chemical composition the same, that we had an entirely different set of things to look after. A design of passes that produced a perfect Bessemer rail would not produce a perfect open hearth rail. In other words, the open-hearth steel did not flow in the same way that the Bessemer steel did. Another characteristic we found in regard to open hearth and Bessemer was that the ragging, or roughing on the rolls, had to be materially reduced in the open hearth in order to keep from making slivers in the steel. In other words, the rolls gripped or bit into the open-hearth steel better than into the Bessemer. We found by experience we had to raise the carbon in open-hearth steel 10 to 20 points higher than on Bessemer, to give the same toughness to the rail. When we did that we found we had another character-

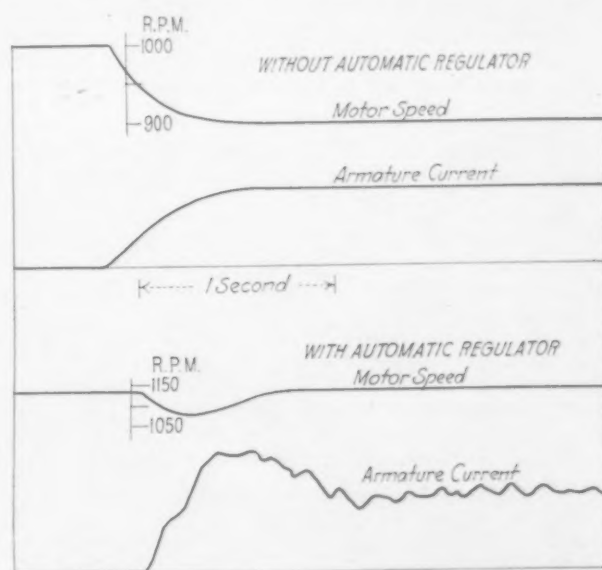


Fig. 6. Speed and Load Curves, Showing the Effect of Load on the Speed of Non-Compensated Direct Current Motors

istic, that the open-hearth steel was a harder proposition to pull through the mill—did not fill out the passes so well as the Bessemer—and I have been wondering if the speed had something to do with the section not filling out. Our mills have a fixed speed; and it has just occurred to me that the open-hearth steel being stiffer, it would not spread out in the various passes, and that perhaps a slower speed would have accomplished that. Outside of that feature I cannot see the value of putting individual motors on a large

\*Roll Designer, Carnegie Steel Co., Braddock, Pa.

mill. What I believe Mr. Stoltz was driving at was that in mills where they have a continuous train of rolls, and when the rolls wear, they have to be dressed in a certain proportion so that when put back into the mill you have the same draft and same volume in each

pass. In a mill driven by individual motors, it would not be necessary for those rolls to be dressed to that particular size. If one wore worse than the others, reduce it in diameter and get more out of the other rolls. I think there would be an advantage there.

## PLANS FOR MACHINERY EXPORTS

### Prospects for Shipments in 1923 to Latin American Countries

BY W. H. RASTALL\*

**D**URING the late war, when many of the Latin American countries were more or less cut off from their accustomed sources of supply, new industries were established. In a number of instances these industries have flourished, thus creating a field for the sale of American machinery.

#### Position of Countries in Trade with United States

Since 1915, Cuba has been our best Latin American market, except during unfavorable sugar market years. However, the price of sugar is now about 3%*c.*, or 35 per cent above 1913, so it would appear that Cuba is well started on the road to recovery. Furthermore, there seems reason to discount somewhat the press reports that large quantities of American machinery still remain undelivered at Cuban ports. Conditions in the machinery markets of Cuba well deserve careful attention at this time. In spite of recent business disturbances, Cuban exchange has remained at par.

chinery in 1921, in spite of the fact that rates of exchange have been unsatisfactory. In July, 1913, the milreis was worth 32.45*c.*; by July 31, 1920, it had fallen to 21.6*c.*; and on Nov. 15, 1922, it was quoted at 11.53*c.* It should be remembered that Brazil is larger than the United States, but its railroad mileage is only approximately what was in operation in the United States in 1855. The country contains wonderful opportunities for development that lead to the purchase of machinery. The population is over 30,000,000 and the country appears to have reached the state where it will require large quantities of machinery.

Argentina has ranked well as a market for our machinery. Exchange, which stood at 43.45*c.* to the peso in July, 1913, and was 39.06*c.* on July 31, 1920, and 20.125*c.* on Aug. 17, 1921, had recovered to 36.1*c.* on Nov. 15, 1922. Though only about one-third the area of Brazil, Argentina has 20 per cent greater railroad mileage, with a population of about 8,500,000. In certain sections the country is comparatively well developed.

Among the markets for American machinery Peru took more machinery than South Africa in 1921. In July, 1913, the Peruvian pound had an exchange value close to parity (\$4.86). On July 31, 1920, it was worth \$3.65, and on Nov. 15, 1922, had recovered to \$3.91. At present important railway expansion, irrigation work,

Destination of industrial machinery exported from the United States.

Destination	Fiscal Year			Calendar Year		
	1910	1913	1915	1919	1920	1921
Canada, Newfoundland, etc. ....	\$14,368,755	\$32,740,377	\$15,740,484	\$57,490,321	\$68,534,672	\$28,867,066
Europe (except Balkans).....	14,161,707	29,117,195	89,790,973	112,178,313	116,848,098	44,844,196
South America*.....	5,553,574	10,690,991	4,606,836	26,180,072	35,787,203	30,631,382
Mexico and Central America...	6,914,500	6,433,548	2,858,474	11,450,859	22,293,921	34,381,861
West Indies, etc.*.....	2,923,918	5,375,266	4,466,958	22,248,987	47,087,299	27,146,318
Total Latin America.....	15,391,992	22,499,805	11,932,268	69,879,918	105,168,423	92,159,561
Asia (except Asia Minor).....	3,805,620	6,530,936	4,443,287	73,116,419	71,296,081	64,424,150
Australasia .....	2,209,862	3,566,129	2,999,898	5,792,748	8,171,153	7,706,546
Africa .....	1,441,949	1,591,746	1,573,369	5,615,898	7,652,579	4,643,732
Other .....	119,713	424,884	567,052	6,382,142	5,959,351	3,791,113
Grand total.....	\$51,489,598	\$96,471,072	\$77,047,331	\$320,455,759	\$383,630,357	\$246,436,364
Percentage to Latin America..	29.9	23.3	15.5	18.7	27.5	37.4

\*Countries bordering on the Caribbean Sea (Colombia and Venezuela) are included under the West Indies group.

Mexico absorbed more American machinery than any other country in 1921. In spite of unsettled conditions, that country for a number of years has been one of our most important markets. There are certain problems involved in contracting to deliver machinery and receive payment at a Mexican destination, but those manufacturers who arrange to collect before their products cross the border have found their Mexican business very attractive and the volume of such business has been large. Mexican exchange is very close to par.

Brazil took over \$8,700,000 worth of American ma-

\*Chief, Industrial Machinery Division, Department of Commerce.

### American Steel Foundries Report

The income account of the American Steel Foundries for 1922 shows net profits, after Federal taxes and all charges, of \$3,709,866, which, after allowing for the dividends on the preferred stock, amounted to \$4.03 per share on the 675,009 outstanding shares of common stock, contrasted with the \$3 dividend rate and 13*c.* per share earned on 612,030 shares of common stock in 1921. Operating earnings after manufacturing, selling and administration costs, as well as Federal taxes, footed up to \$4,481,840, or \$3,053,653 larger than those for 1921. For depreciation, \$945,625 was charged off last year, or \$432,891 more than in 1921. Interest charges dropped to \$71,420, or \$84,622 less than those for 1921. According to President Lamont, the corporation's properties are operating at about 80

per cent of capacity, while there is on the books or definitely in sight sufficient business to keep this ratio of production during the first six months of 1923. Prices obtained several months ago were close to cost; today they are considerably higher.

To a great degree Chile depends upon the prosperity of the nitrate business. Chile took \$5,600,000 worth of American machinery in 1919 and \$3,500,000 worth in 1921.

At present Colombia is an exceptionally promising market, because of the extensive oil operations and the comprehensive railroad program. The volume of Venezuela's purchases of our machinery has expanded in a decade from \$110,000 to \$1,400,000 annually.

per cent of capacity, while there is on the books or definitely in sight sufficient business to keep this ratio of production during the first six months of 1923. Prices obtained several months ago were close to cost; today they are considerably higher.

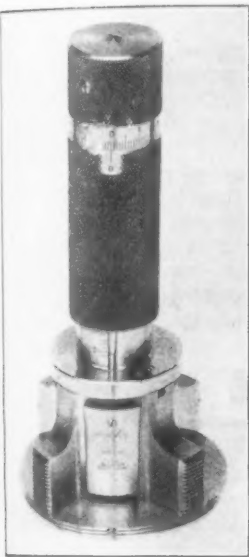
Civil service examinations are announced as follows: Radio engineers, for which applications must be made by May 1; engineers for the coast and geodetic survey, for which applications must be made before June 30, and assistant examiner of the patent office, examination to be held on April 4, 5 and 6. Applications should be made to the United States Civil Service Commission, Washington, asking for form 2118 for the radio engineer examination and for 1312 for each of the others, stating the examination desired.



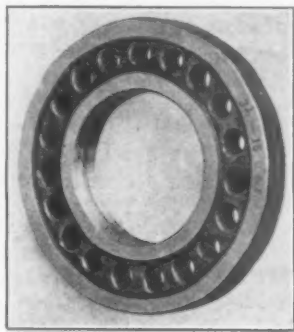
### New Bath Internal Thread Micrometer

A new internal thread micrometer, as shown in the accompanying illustration, has been added to the line of John Bath & Co., Inc., Worcester, Mass. It is available in all commercial sizes, the range of each being 0.020 in. below to 0.020 above the nominal size. Lightness for size is one of the features emphasized. A similar gage developed by the company was described in THE IRON AGE of June 16, 1921.

The gage measures the exact size of a threaded hole, and reads the same as a micrometer caliper. It can be reground until it is worn out and may be always kept in size by means of the master reference ring illustrated. New jaws can be fitted by the maker. The four projecting jaws seat firmly on inclined dove-tail slots in the cylindrical jaws, which are actuated by a micrometer screw. The measuring jaws, which are relieved for lightness, are held back against the handle



Micrometer For Measuring Internal Threads. It can be reground until worn out, and may be kept up in size by referring to master reference ring below



by a large threaded flange intended to serve as a threaded pilot and to facilitate catching the thread in the work. The thread pilot is ground several thousandths under the nominal size, and is provided with four notches for removing chips. The micrometer is cylindrically ground at its minimum so that when the gage is expanded in the work, to normal size, the jaws make line contact in the threaded hole.

In using the micrometer, it is first contracted a few thousandths under the normal size, screwed into position and then expanded until the measuring jaws come into contact with the threaded hole. The reading is then taken from the graduated dial and the gage contracted and removed. When wear occurs on the measuring jaws the instrument is checked on the master reference ring. Provision is made for setting the reading dial to zero when the micrometer is set to size in the ring.

The forty-eighth annual convention of the Amalgamated Association of Iron, Steel and Tin Workers will be held next May in Warren, Ohio, and the program for this event is already being formulated. This convention always precedes the annual conference with employers for the purpose of renewing the wage scale for the ensuing calendar year. In their gathering, workers affiliated with the Amalgamated Association adopt their program with respect to wage scale and working conditions.

The National Railway Appliances Association will hold its annual exhibition of appliances used in steam and electric railroad operation, construction and maintenance at the Coliseum and Annex, Chicago, March 12 to 15, inclusive. C. W. Kelly, secretary-treasurer of the association, People's Gas Building, 122 South Michigan Boulevard, Chicago, is director of exhibits. The president of the association is T. W. Aishton, National Malleable Castings Co., Chicago.

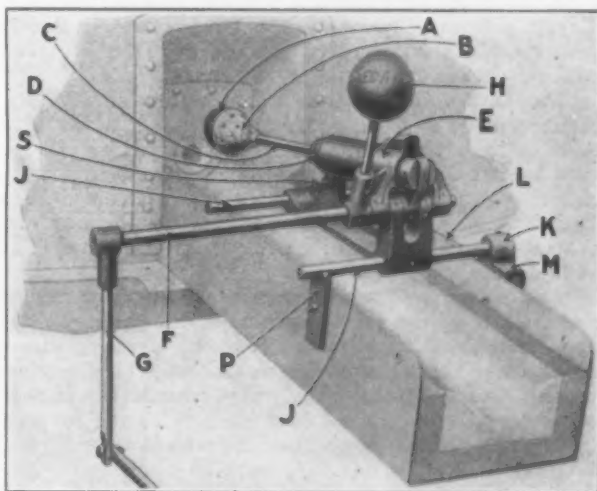
### Safety Cupola Tapper and Stopper

A device for tapping and stopping cupolas capable of ready attachment to the existing cupola has been placed on the market by the Medart Co., St. Louis.

The economy of the apparatus in foundries operating continuous heats, eliminating the hinged spout commonly used and the extra man needed to operate it, is emphasized. The operator may be stationed at a comfortable distance back from the heat of the melt and there is no need to relieve him. Small amounts of iron can be tapped at a time.

A special composition ball, A, fits against the breast of the cupola when the flow is stopped. It is bolted to the cup, B, which is threaded on the piston rod, C. The piston rod is threaded into the piston, D, and moves back and forth into the sleeve and frame, E. The piston is attached with pin and link at the rear, to the lever shaft, which carries the lever, G, by which the device is actuated. A counterweight, H, mounted on the lever shaft as shown, serves to rigidly hold the ball in or out of the breast. The chained pin, S, may be used also to lock the ball out of the breast, as when the breast is being built. Extensions may be added to the actuating lever, according to the more convenient point of operation. Adjustment of the ball up and down to assure a nice fit in the breast is made by means of a set screw, located beneath the sleeve, E. Except for the composition ball, A, no parts of the device are subject to appreciable wear. The ball is renewed after four to six heats. A hinged frame is provided, that the apparatus may be turned entirely out of the spout in a short time, as when the breast is being built and the spout lined, or a new ball put on, or in case of accident.

In attaching the apparatus holes are marked on the right-hand side of the spout for the lugs, M, and on the left-hand side for the lug, P, at points that will permit the tapper and stopper to set level and permit the ball, A, to enter into the breast properly. No extra work is necessary to building the breast and the apparatus requires no particular care or attention beyond keeping the ball in good condition. This is done by removing the fire clay from around the cup, B, after each heat, unscrewing from the rod, C, the cup, B, with the ball, A, attached, and dressing the ball to its original shape with a file or an emery wheel. This is said to be accomplished in a few minutes. The ball and cup are then screwed to the piston rod, C, and the cup, B, and the



Apparatus For Safe and Positive Tapping and Stopping of Cupolas

piston rod covered with fire clay and dried with the fire in the spout, when the breast is dried. When a new ball is put on, the hole in the end of it, where the bolt head seats, is packed with fire clay. The bolt attaches the ball to the cup, B.

Something more than 100 puddlers employed by the Saco-Lowell Shops, Lowell, Mass., went on strike last week in protest against the company's plan to pay the men according to experience and value instead of a flat rate. Little inconvenience has been felt by the company.

## STEELS USED IN LOCOMOTIVES

### Partial Analysis of Individual Weights and Total Consumption of Iron and Steel

In a typical Pacific type locomotive of 272,000 lb., the weight of steel plates, castings and forgings and of iron castings and forgings and boiler tubes works out about as in Table I, according to figures furnished by a prominent locomotive builder.

Table I Principal Weights in a Typical Locomotive		
Material	Weight	Per Cent
Steel Plates .....	54,400 lb.	20.0
Steel Castings .....	58,500 lb.	21.5
Steel Forgings .....	20,400 lb.	7.5
Iron Forgings .....	14,700 lb.	5.4
Iron Castings .....	27,700 lb.	10.2
Tubes .....	16,300 lb.	6.0
	192,000 lb.	70.6

The balance of the weight, some 80,000 lb., is made up of miscellaneous items, most of them individually under 1 per cent each, and including bolts, tires, wheels, air-brake work, valves, gages, etc. The bulk of this is iron and steel, but there is also a considerable quantity of brass. Non-metallic items include the boiler lagging and many small details.

While the proportions of some of the various types of material used in locomotives of different types and sizes, all the way from the light switching engine or industrial unit to the powerful Mallet locomotive, vary considerably from one to another, yet it is believed that the percentages given in Table I are fairly representative of the group, considered as a whole, although perhaps not of some of the individual types of engine.

Locomotive orders reported by *Railway Age* for the year 1922 show a total of about 2600 units for domestic use. In the great majority of cases the designed weight

is given, an analysis of nearly 2600 engines showing an average of about 297,500 lb., or some 10 per cent higher than our typical locomotive considered in Table I. The total weight of 2573 locomotives gave an aggregate of 765,416,000 lb., or 341,700 gross tons. On the basis of Table I, then, Table II may be constructed, representing as it does 70.6 per cent of the total weight of the locomotives. Of course, this does not give the entire weight of iron and steel going into the engines, because of the numerous small items of those materials only partially indicated above. It does, however, account for the principal items.

Table II Principal Iron and Steel Materials in Locomotives Ordered in 1922	
Material	Weight, Gross Tons
Steel Plates .....	69,000
Steel Castings .....	73,000
Iron Castings .....	35,000
Steel Forgings .....	26,000
Iron Forgings .....	18,500
Steel Tubes .....	20,500
Total for six items.....	242,000

Of the iron castings above, nearly 10 per cent consists of malleable castings. The steel castings are primarily the locomotive frames and the driving wheel centers, which comprise (in the frame) the largest single casting in the group, and (together) the great bulk of the steel castings. It should be noted that the figures given in Table II represent the net weights after all machining and other cutting has been done. The actual total consumption of iron and steel would be much higher. The 2573 locomotives analyzed according to weight included the following, grouped by individual weights:

75 of under 100,000 lb., average....	74,240 lb.
206 of 100,000 to 200,000 lb., average	157,790 lb.
863 of 200,000 to 300,000 lb., average	263,400 lb.
1304 of 300,000 to 400,000 lb., average	336,600 lb.
125 of 400,000 lb. or over, average..	488,600 lb.

## TREND OF PRICES

### Reaction Late in 1923 Regarded Likely with Severe Test of Federal Reserve System

A paper on the "Trend of Prices," by Prof. Allyn A. Young, Harvard University, was read before the American Economic Association at Chicago, Dec. 27. The following notes have been taken from it.

The advance of prices will not continue indefinitely. There will be a reaction, probably late in 1923. But there is little chance that then or later prices will return to their pre-war level. It is undesirable that they should. Drastic deflation would not compensate for the injustice wrought by the inflation of the war and post-war periods. It would bring with it a new series of injustices.

Furthermore, drastic deflation is virtually impossible. Half of the bank deposits of the country rests upon undigested issues of government and corporation securities. These can be absorbed only by the slow processes of taxation and of the accumulation of savings.

#### Not a Long Time Movement

The present rise of prices is a cyclical rather than a long time movement. It is not likely that it will continue until the present enormous surplus reserves of the Federal Reserve system are exhausted. Before available supplies of credit are exhausted, other factors will probably bring the period of expansion to an end. For one thing, costs of production will increase rapidly and will diminish business profits. In the second place, advancing prices are attended by a redistribution of the demand for consumers' and producers' goods. The expansion of production, however, advances under its own momentum in such a way as to increase its unfitness to meet the shifting of buyers' demands.

The rise of prices in 1923 is likely to be distinctly greater than it was in 1922. Agricultural prices will probably rise faster than the general average, but it

is improbable that in 1923 they will fully regain their normal relation to the prices of manufactured goods.

### Federal Reserve System to Be Further Tested

Slight advances in rediscount rates, largely by reason of their psychological effect, would without doubt retard the expansion of business and diminish the rise of prices. More drastic steps would be less likely to hold things where they are now than to force a reaction in prices. If prices are permitted to take their normal upward course, and reaction comes later, the Federal Reserve banks, if they still hold surplus reserves, are likely to be pressed to use inflationary measures to postpone the inevitable.

The year 1923 is fairly sure to put the economic and political strength of the Federal Reserve system to a severe test. Maladjustments in the price structure, and the uneven progress of different industries, make it hazardous as well as unwise for the Federal Reserve banks to act now. On the other hand, a purely passive policy will in the long run only accentuate the difficulty of their problems. Somewhere between the two extremes of premature action and of action too long delayed they may find, it is to be hoped, a right middle course.

The United States Steel Corporation has appropriated about \$1,000,000 for dock improvements for the Bessemer & Lake Erie Railroad at Conneaut Harbor, Ohio, and work will be started as soon as plans have been approved by the War Department. It is planned to reconstruct No. 1 dock, which has been out of service for several years. This dock, which is a wooden structure, will be replaced by one of concrete, and it is also proposed to widen and deepen the channel between this and No. 4 dock, which for several years the road has been using for unloading, shipping and storing ore. Changes in No. 1 dock will provide increased storage space, and when completed will have an area for 2,000,000 tons of ore. Storage capacity of No. 4 dock is about 1,000,000 tons.



## NEW USE FOR SHEETS

Manufacturer of Steel Car Doors  
May Require Upward of 350,-  
000 Tons a Year

**E**XPANSION of the steel business is accelerated of course by discoveries of new uses for mill products. The recent development of a single product, a sheet steel door for freight cars, promises to have far-reaching effects on mill production, even to the extent of necessitating additions to present plant capacity, according to views in some quarters.

The box car door probably gets more use and abuse than any other one part of freight car equipment. In loading and unloading it is the one part of a car handled and mishandled by the public, which naturally has no interest in the care or maintenance of railroad property, being concerned only with the expeditious shipment or receipt of freight. The car door not only has a short life, rarely over three years, but it is frequently in bad order, and generally the entire car is put out of service whenever the door is being repaired or replaced. Fully 500,000 wooden car doors are replaced in this country every year, it is estimated, while there is no record of the detention of rolling stock due to door repairs. In addition, from 200,000 to 400,000 doors are hung on new cars annually.

Steel car doors have been tried time and again, but they have proved either too heavy, too costly or no sturdier than the wooden doors. A new type of door made of corrugated blue annealed sheets has been developed by the Steel Door, Inc., Chicago. It is stated to be as light as the common type of reinforced wooden door and to cost to the railroad little if any more. The construction is simple and calculated to insure long service with no repairs or maintenance outside of periodical painting.

The ordinary size of car door is built of three corrugated panels of No. 13 gage blue annealed sheets which overlap at the joints, where they are riveted. Along the two long sides of the door a corrugation has been pressed into the metal at right angles to the lateral



corrugations. It was upon the provision of a die which would press out a longitudinal corrugation with the lateral corrugations running into it that the successful construction of the door depended. Through the longitudinal corrugation a flat strip of metal is provided on the edge over which may be lapped a stiffener. No. 12 gage material is used for the stiffener which is a flat strip bent over to lap the panels. The assembled door, it is to be noted, is of single-ply material except at the joints where it is two-ply and on the four edges where it is three-ply, rivets being passed through stiffener, panel and stiffener.

The ordinary box car door constructed in this fashion weighs 400 lb. Double automobile car doors, such as shown in the illustration, have four panels and weigh 800 lb. For 500,000 replacements and 300,000 doors for new cars per year, 320,000 tons of steel would be required, not taking into account the greater weight of automobile car doors. It is recognized, of course, that if steel doors should become universal, the present rate of replacement turnover could not be counted on. The growth of population and traffic, however, should insure heavier annual requirements in new cars.

The patent rights of the Steel Door, Inc., have been taken over by a new company, the American Steel Door Co., which has been organized to market the product. Charles Brearly Moore is president and offices are in the Railway Exchange Building, Chicago. The manufacture of the door is being done by contract.

## FOUNDRYMEN'S ASSOCIATION

Officers Nominated for Ensuing Year—Preparations for Cleveland Convention

A meeting of the nominating committee of the American Foundrymen's Association was held Tuesday, Jan. 23, at the Cleveland Athletic Club, Cleveland, for the purpose of nominating a president, vice-president and five directors, the latter for three-year terms each, with the following results:

For president to serve for one year: G. H. Clamer, Ajax Metal Co., Philadelphia. For vice-president to serve for one year: H. B. Swan, Cadillac Motor Car Co., Detroit. For directors to serve three-year terms each: L. L. Anthes, Anthes Foundry, Ltd., Toronto, Ont.; T. S. Hammond, Whiting Corporation, Harvey, Ill.; Alfred E. Howell, Somerville Stove Works, Somerville, N. J.; C. R. Messinger, Chain Belt Co., Milwaukee, Wis., and Thomas W. Pangborn, Pangborn Corporation, Hagerstown, Md.

Prospects for a record-breaking convention and exhibition at Cleveland, April 28 to May 3, are reported. All technical meetings are to be held at the Hollenden Hotel, 800 ft. from the exhibition hall. The annual banquet will probably be scheduled at the Hotel Cleveland, Wednesday evening, May 2. A foundrymen's good fellowship meeting is being considered for Tuesday evening, May 1.

The receipt of 113 applications for space at the exhibition during the first two weeks is reported as a record.

## New York Steel Treating

The February meeting of the New York Chapter of the American Society for Steel Treating, to be held in the assembly room of the Merchants' Association of New York, Woolworth Building, Wednesday evening, Feb. 21, will be addressed by J. V. Emmons, metallurgist Cleveland Twist Drill Co., who will discuss "Machinability of Tool Steels."

## Survey of Buffalo Industries

In a survey of Buffalo industries, recently completed, it is found that the largest single group of workers was that of foundry and machine shop employees, 15,846 being engaged in such industries of which there are 252 separate establishments. The survey reveals that Buffalo has 293,000 factories and the value of products is \$634,409,733. The survey covers 130 separate classifications. With the exception of New York, Buffalo leads in the number of diversified interests in New York State, 93,497 being engaged in industries there. Car shops have 4178 with an urgent need for twice that number.

## Valley Scrap Market

YOUNGSTOWN, Feb. 6.—Prices above \$23 for heavy melting scrap are intimated by dealers. A period of active demand is forecast owing to the large requirements of melters, while stocks of some of the larger interests are reported lower than ordinarily carried.

## FOREIGN MERCHANTS BUY

### Merchant Inquiries Increase from Japan and China —Australia and India Markets for Couplers

NEW YORK, Feb. 6.—Both the Japanese and Chinese markets are active in merchant inquiries, but no large business is expected from the latter until after Feb. 15, the Chinese New Year. However, at present there are numerous small inquiries current from China for second hand material, wire shorts, tin plate, galvanized and plain wire, wire nails, bars and plates. There is a fair demand for galvanized sheets. One exporter recently booked an order for four carloads of galvanized sheets, 48 to the crate of 532 lb., about 32 gage. One large interest in the United States has received orders from China for about 1600 tons of material in the past few weeks and an exporter to Chinese markets reports that he is now bidding on about 4500 tons of material. One inquiry includes about 2000 kegs of wire nails and small tonnages of pipe, galvanized sheets, bars, etc. Another export house reports the sale of 350 kegs of cut nails.

Japanese merchant inquiry is large and buying is keeping pace with it. In fact, some exporters are of the opinion that part of the present Japanese activity is of a speculative nature, but the rapid rise in the American market is expected to discourage any serious attempts at speculation. The recent rises in the sheet market on export sales have been an obstacle to sales of exporters, who by the time they have received acceptance from Japan of a quotation, find that the market has again increased. At present the price of light gage black sheets is said to be about \$103 per ton, c.i.f. Japanese port, while the British market is still at about \$85 per ton, c.i.f. port.

None of the current rail tenders are reported awarded as yet. Although no inquiry is yet in the hands of Japanese export houses which usually handle large rail tenders, it is reported that the Imperial Government Railways is preparing to ask for bids on 6000 tons of 75-lb. rails. The 123 tons of I beams, bids on which were opened Jan. 31, by the Imperial Government Railways were awarded to Suzuki & Co. In ad-

dition to numerous sheet inquiries from merchant sources ranging from 100 to 500 tons each, there is a tender in the market for 13,500 boxes of oil can tin plate from an oil interest in Japan.

There is a possible market for American car couplers in the Far East, according to reports to the Bureau of Foreign and Domestic Commerce by consuls at Adelaide, Australia, and Calcutta, India. The type of coupler now in use on Indian trains is not suited to heavy trainloads, although there would be economy in increasing the size of loads carried. In view of making a change the Indian Railway Conference Association is sending a representative to the United States to report on the various makes of couplers in use here.

The use of heavier engines and trains on Australian railways planned by the new American railway commissioner will require the installation of a much stronger coupler than is now in use. Couplers of this type are not manufactured in Australia.

By the Iron and Steel Products Bounty Act of 1922, the Governor General of Australia is authorized to pay a bounty on fencing wire, galvanized sheets, traction engines and wire netting manufactured in the Commonwealth, if the products are made from materials produced or manufactured in Australia. The bounty is also allowed if in the opinion of the Minister of Trade and Customs the use of materials produced elsewhere is warranted. The bounty may be withheld if in the opinion of the Tariff Board the manufacturer is not selling at a reasonable price, or if his profits exceed 15 per cent on capital employed. The total bounty paid in one year may not exceed £250,000.

There is a lively market for copper in Austria, says a recent report to the Bureau of Foreign and Domestic Commerce. The electrical industry used about 6700 tons in 1921 and it is stated that demand has been increasing lately. During 1921 Germany supplied the greater part of the copper demand, but now that both Germany and Czechoslovakia are overloaded with orders for many months, the Austrian buyers are practically dependent upon direct purchases from American exporters. The Verband der Metallindustrie Oesterreichs buys for the Austrian consumers of raw copper and handles exports of their semi-finished copper products.

## NEW RECORDS MADE

### Remarkable Performance of Trumbull-Cliffs Stack —Tennessee Achievements

A remarkably fine record for pig iron production in a month by a single furnace was established in January by the 600-ton stack at Warren, Ohio, of the Trumbull-Cliffs Furnace Co., supplying hot metal to the open-hearth furnace department of the Trumbull Steel Co. Without the use of scrap or metal, working on iron ore only, the furnace produced 23,364 gross tons of pig iron in the 31 days of January, for a per diem average of 753 tons. During the last two weeks of the month, the daily run was 797 tons. The highest known production for a 24-hr. period was 921 tons, declared to be the highest mark ever reached by a furnace not using scrap.

Less than 1½ per cent of the product contained 0.5 sulphur, and the total amount of flue dust in the month per ton of iron was 143 lb. Records were made without sacrificing quality of the iron, declare officials. An average of 1986 lb. of standard Connellsville coke to the gross ton was used, the coke being furnished by the W. J. Rainey Co.

J. S. Fraser is works manager, in immediate charge of the stack, which is jointly owned by the Cleveland-Cliffs Iron Co. and the Trumbull Steel Co.

#### Other New Records

The Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., broke prior production records in January as follows:

Ensley open-hearth mill, 102,613 tons; best prior record, 99,005 tons in May, 1922.

Ensley blooming mill, 79,657 tons; best prior record, 75,902 tons in May, 1922.

Ensley rail mill, 48,550 tons; best prior record, 46,541 tons in April, 1913.

No. 1 blast furnace at Ensley, 16,393 tons; best prior record, 15,881 tons in October, 1922.

Six Ensley blast furnaces, 85,007 tons; best prior record, 81,180 tons in December, 1922.

Bessemer guide mill, 3,189 tons; best prior record, 3,008 tons in March, 1920.

Bessemer bar mill, 4,919 tons; best prior record, 4,158 tons in October, 1922.

By-products coke plant at Fairfield, 158,735 tons; best prior record, 158,522 tons in December, 1922.

Docena coal mines, 60,580 tons; best prior record 58,224 tons in November, 1922.

Vann's dolomite quarry, 13,599 tons; best prior record, 13,227 tons in April, 1922.

All departments of the Sharon Steel Hoop Co., Sharon, Pa., established new production records in January, according to announcement by officials. The open-hearth department, blooming and bar mills made and rolled down more steel last month than in any previous 30-day period, while the Sharon strip mills and the Hazleton sheet mills also set up new records.

Plans for the consolidation of the Hydraulic Steel Co. and Parish & Bingham Corporation, Cleveland, and the Detroit Pressed Steel Corporation, Detroit, are under way, and while the details have not yet been entirely worked out, it is announced that the merger will probably be effected. The consolidation, if it takes place, will bring together three of the largest Central Western manufacturers of automobile frames and other sheet metal stampings.



## GERMAN MARKET BOOMING

Production in Unoccupied Districts Safeguarded by Imported Coal and Coke—Prices Advance Rapidly

(By Radiogram)

BERLIN, GERMANY, Feb. 5.—As a result of the boycott of French and Belgian steel and fear that the French may prevent deliveries from the occupied district, the market is booming. Production in the unoccupied districts can be maintained, North German and Illseder smelters (blast furnaces) having reserves of imported coke and coal, while South German works are preparing to increase the imports of Czechoslovakian coal.

Contracts for Swedish magnetite to the amount of 5,000,000 tons yearly have been renewed until 1932. The price was 15½ crowns (\$4.15 at normal exchange of 26.8c. per crown; \$2.88 at present exchange of 18.6c. per crown). Manufacturers have sufficient steel for four months. Prices are moving rapidly upward.

Foundry iron No. 1 is now quoted at 506,300 m. per metric ton (\$13.89 per gross ton, at 0.27c. per 100 m.), compared with 332,600 m. (\$8.45 at 0.25c.) last week. Steel ingots are priced 623,000 m. (\$17.09), compared with 417,000 m. (\$10.59); steel bars at 860,000 m. (1.05c. per lb.), compared with 576,000 m. (0.65c. per lb.) and thin steel sheets at 1,341,000 m. (1.64c. per lb.), compared with 898,900 m. (1.02c. per lb.). Scrap is quoted at 540,000 m. (\$14.81 per gross ton). The advances above average about 50 per cent, in one week, when expressed in marks, and about 60 per cent, as expressed in dollars and cents.

## Great Activity in the Valleys

YOUNGSTOWN, Feb. 6.—Highest record in blast furnace operation in the Youngstown district in the past two and one-half years was reached this week, with the blowing in of No. 1 stack in the Haselton group of the Republic Iron & Steel Co. This action brings the total number of active furnaces in the Mahoning and Shenango Valleys to 34, of 46. Previously there have been 47 stacks in the two Valleys, but the number is reduced owing to dismantling of the Hall furnace at Sharon, Pa., of the Republic company. Iron production is in excess of 85 per cent of capacity.

Steel making is being maintained at fully 90 per cent, while some finishing departments are being retarded on account of steel shortage, and expansion in others is delayed. Shortage of steel has obliged the Republic company this week to reduce the number of active sheet mills at its Niles plant to eight, which is operating therefore on a 50 per cent basis.

Of the 114 sheet mills in the Mahoning Valley, 95 were scheduled at the beginning of the week, somewhat less than usual because of lack of steel.

Skelp production is being pushed by both district independent makers to meet the heavy requirements of rolling schedules of the tube mills. Principal makers are operating from 85 to 95 per cent of capacity in all departments.

## Tennessee Company Very Busy

BIRMINGHAM, Feb. 6.—In order to get more iron for steel mills, the Tennessee company has diverted a Bessemer furnace from foundry to ingot mold iron. It has two stacks on foundry and eight on basic. The company is pressed to capacity to fill orders on books. It shipped 2900 tons of rails to the Alaskan Engineering Co., Seward, Alaska, this week via Mobile. Prior steel-making records were broken in January, the ingot mill turning out 102,613 tons and the rail mill 48,550 tons. Wire mills are allocating product to regular customers. Steel bars are firm at 2.35c. to 2.40c., f.o.b. Birmingham.

## LUXEMBURG IRON TRADE

Rapidly Being Checked by the Cutting Off of Fuel Supplies

LUXEMBURG, LUXEMBURG, Jan. 19.—If it were not for the present political events, which, owing to the uncertainty they imply about future fuel supplies are inducing producers to postpone new orders, Luxembourg iron and steel trade, like that of Belgium and of France, would certainly be on the threshold of a real period of activity. The first days of the Franco-Belgian occupation of the Ruhr were marked by a serious decrease in coke shipments to Luxembourg, Belgium and France. Shipments of Belgian coke to Luxembourg had been proceeding at a reduced pace. The blowing out of a number of Luxembourg blast-furnaces may become a necessity. [The British cabled report on page 384 of THE IRON AGE of Feb. 1 showed that five had been blown out, leaving probably not over 26 active of the total of 45.]

Owing to the insufficiency of its production in comparison with an accrued demand, the Luxembourg iron trade, whose domestic outlets are practically nil, is no more playing on the export markets the important part it played some time ago.

## Coke and Coal Prices Lower in Youngstown District

YOUNGSTOWN, Feb. 6.—In face of the firmness in finished steel, lower coal and coke prices are appearing. This decline is yet to run its course, in the opinion of manufacturers, who predict it will aid in materially cutting manufacturing costs. Coking coal is quoted at \$3.50 maximum, comparing with recent maximums of \$3.75 to \$4. Connellsville furnace coke is \$8 maximum in the spot market, representing a decline of 50c. to 75c. Prices under \$6.50 for furnace coke and under \$3 for coking coal are predicted.

Prevention of the coal strike April 1 and somewhat improved transportation conditions the last two weeks in January are accountable for the softening in fuel prices, it is pointed out. Industrial consumers in the Valleys contracted for their requirements for the quarter at prices considerably below current levels; otherwise they say prices of their products would be considerably higher than they now are.

Lower coke prices may bring into action a number of merchant blast furnaces not supported by their own coke ovens, it is pointed out, and unable to produce and sell profitably at prevailing levels. Iron supply from this source would help reduce the overhanging demand.

## Shipbuilding in Europe

Determined to carry cargoes at rates which forbid American competition because of the higher costs under our flag, European nations vie with one another in shipbuilding enterprises, which now nearly parallel those of pre-war times. Germany, seeking concessions at the reparations door, has nearly as much tonnage building as in 1914. Holland, though balked by the languishing trade in the Orient, shows greater tonnage under construction than in 1914; and Italy, shaking herself from long industrial depression, has three times her 1914 tonnage now being constructed.

Comparative tonnages under construction follow:

	Jan. 1, '23	July 1, '14
Germany .....	416,000	547,000
Danzig .....	47,000	
Italy .....	211,000	69,000
France .....	188,000	226,000
Holland .....	142,000	116,000
Total .....	1,004,000	958,000

Reading against this the Jan. 1 figures, which show less than 400 of the 1379 vessels of the United States Shipping Board in service, one gets a fair appraisal of the prospects for American shipbuilding and American commerce.

## FABRICATED STEEL BUSINESS

### Steel Building Awards Total 52,470 Tons and Oil Tanks, 20,500 Tons

Fabricated steel work awarded in the past week includes the following:

Howard Ware department store, New Rochelle, N. Y., 600 tons, to Hinkle Iron Works.

Ice plant at Sheepshead Bay, N. Y., 400 tons, to Hinkle Iron Works.

Apartment building on East Fifty-second Street, New York, 400 tons, to Harris Structural Steel Co.

Apartment building on Eighty-sixth Street, New York, 900 tons, to Paterson Bridge Co.

Apartment building on Eighty-sixth Street, New York, 600 tons, to A. E. Norton, Inc.

Power plant at Norwich, Conn., 600 tons, to Berlin Construction Co.

Apartment building on West End Avenue, New York, 700 tons, to Harris Structural Steel Co.

Chesapeake & Ohio Railroad bridges, 600 tons, to American Bridge Co.

Inspiration Copper Co. plant at Miami, Ariz., 1800 tons, to an unnamed fabricator.

Long Island Railroad bridges, 1600 tons, to Shoemaker Satterthwait Bridge Co.

United Cigar Stores Co. office building, Akron, Ohio, 500 tons, to Riverside Bridge Co.

Life Insurance Co. of Virginia office building, Richmond, Va., 1300 tons, to American Bridge Co.

Sinclair Crude Oil Purchasing Co., oil storage tanks, 7000 tons, divided about equally between Chicago Bridge & Iron Works and Petroleum Iron Works.

Garage at Broadway and 187th Street, New York, 800 tons, to Hay Foundry & Iron Works.

Malden & Melrose Gas Light Co., Malden, Mass., retort house and conveyors, 400 tons, to Berlin Construction Co., Berlin, Conn.

Star Worsted Mills, Fitchburg, Mass., addition, 200 tons, to Lehigh Structural Steel Co.

Chicago Union Station Co., Roosevelt Road viaduct, 4020 tons, to American Bridge Co.

Chicago, Burlington & Quincy, freight house, Harrison Street terminal, Chicago, 3600 tons, to Bethlehem Steel Corporation.

Petroleum Midway Co., San Pedro, Calif., storage tanks, 6000 tons, to Chicago Bridge & Iron Works.

Bascule bridge over Calumet River, Burnham, Ill., 787 tons, to Strobel Steel Construction Co.

City of Chicago, Roosevelt Road viaduct, 750 tons, to Milwaukee Bridge Co.

Kansas City Joint Stock Land Bank, Kansas City, 690 tons, to unnamed fabricator.

Rock Island Lines, deck and through plate girder spans in Oklahoma, 664 tons, to American Bridge Co.

Central Finance Building, Los Angeles, 600 tons, to Llewellyn Iron Works.

Baseball park, Louisville, Ky., 600 tons, to International Steel & Iron Co.

Plant, Red Wing, Minn., 600 tons, to Minneapolis Steel & Machinery Co.

Carpenter Building, Grand Avenue and Sixth Street, Milwaukee, 1300 tons, to Worden-Allen Co.

Addition, Pennsylvania Railroad freight depot, Detroit, 900 tons, to American Bridge Co.

Bridge repairs, Buffalo, Rochester & Pittsburgh Railroad, 750 tons, to American Bridge Co.

United Cigar Stores Building, Akron, Ohio, 550 tons, to Riverside Bridge Co.

Fourteen steel barges, United States Engineers, Nashville, Tenn., 1400 tons, to Penn Bridge Co.

Warehouse, Frank & Seder, Pittsburgh, 650 tons, to J. E. Moss Iron Works.

Office building, Western Clock Co., Peru, Ill., 192 tons, to J. E. Moss Iron Works.

Toronto Transportation Co., Toronto, 2000 tons of steel and 700 tons of reinforcing bars, to Dominion Bridge Co.

Redford Building, Toronto, 800 tons, to Dominion Bridge Co.

T. Eaton Co., Toronto, store addition, 2000 tons of steel and 90 tons of reinforcing bars, to McGregor & McIntyre.

Ford Motor Co. of Canada, 2000 tons for Toronto plant and 3500 tons for plant at Ford, Ont., to Canadian Bridge Co.

Mexican Petroleum Co., oil storage tanks, 7500 tons, to Lacy Mfg. Co., Los Angeles, Calif.

Sinclair Refinery Co., oil refinery at Marcus Hook, Pa., 3500 tons, to Phoenix Iron Works Co., Meadville, Pa.

Cadillac Hotel for Book Estate, Detroit, 6500 tons, to Bethlehem Fabricators, Inc.

United Cigar Store Building, Akron, 200 tons, to Riverside Bridge Works.

### Structural Projects Pending

Inquiries for fabricated steel work include the following:

Sinclair Crude Oil Purchasing Co., oil tanks for Oklahoma and Wyoming fields, 16,000 tons.

Texas Co., oil storage tanks, 13,000 tons.

Phoenix National Bank Building, Hartford, Conn., 300 tons.

Sinclair Refining Co., six 80,000 bbl., ten 55,000 bbl. and 60 smaller tanks for Marcus Hook, Pa., 7100 tons.

Cherry Street Bridge, Appleton, Wis., 810 tons.

Hotel, Danville, Ill., 500 tons.

Rome Brass & Copper Co., plant, Chicago, 300 tons.

Two high school buildings, Piqua, Ohio, about 400 tons, bids being taken.

Office building, United Travelers, Columbus, Ohio, tonnage unstated, bids being taken.

Bell Telephone Co. of Canada, Toronto, building, 1700 tons.

Robert Simpson Co., Toronto, addition to store, about 300 tons.

Libby Owens Sheet Glass Co., Charleston, W. Va., factory, 725 tons.

Colson Co., Elyria, Ohio, extension, 400 tons.

Falcon Steel Co., Niles, Ohio, extension, 130 tons.

Ingram-Richardson Co., factory at Bayonne, N. J., 300 tons. Old inquiry revived.

High school, Niagara Falls, N. Y., 200 tons.

## RAILROAD EQUIPMENT BUYING

### Orders for 1700 Cars and 138 Locomotives—New Inquiries for 5400 Cars

The Mobile & Ohio Railroad has let 800 cars to American Car & Foundry Co., of which 500 are box cars, 100 stock cars and 200 hoppers.

The Delaware, Lackawanna & Western is in the market for 300 automobile cars.

The Pittsburgh Railways, Pittsburgh, have let 50 street cars to the St. Louis Car Co.

The Southern Railway is in the market for 1600 steel center constructions for freight cars.

The Atlantic Coast Line has let 500 sets of underframes and superstructures for box cars to the Virginia Bridge & Iron Works.

The Illinois Central has withdrawn its inquiry for 2000 box cars and is now asking for prices on 1500 automobile and 500 automobile-furniture cars.

The Pacific Fruit Express has placed 200 refrigerator cars with the American Car & Foundry Co.

The Union Pacific has ordered 10 horse baggage cars from the American Car & Foundry Co. and 10 dining and 8 observation cars from the Pullman Co.

The Western Pacific has placed 20 coaches and 8 dining cars with the Pullman Co. and 20 baggage cars with the Western Steel Car & Foundry Co.

The Central of Georgia has placed 2 baggage and express and 2 partition coaches with the Pullman Co.

The Southern Pacific has ordered 575 general service cars from the Ralston Steel Car Co. and is building 500 logging cars in its own shops on the Coast.

The Elgin, Joliet & Eastern is inquiring for 300 dump and 500 composite gondola cars.

The Atlantic Coast Line is inquiring for 500 box cars.

The Duluth, Missabe & Northern is in the market for 100 box cars.

The Michigan Central is inquiring for 100 hopper cars.

The American Tank Car Corporation is inquiring for 600 steel underframes.

Swift & Co., Chicago, are building 200 refrigerator cars in their own shops.

Including orders for 10 locomotives for the Chicago & Eastern Illinois and 15 for the Virginian Railway, already reported in these columns, the American Locomotive Co. has issued a list of 163 engine orders, in part as follows: Canadian Pacific, 16 Pacific type (310,000 lb.); Illinois Central, 15 Mountain type (357,000 lb.); Central Railroad of Georgia, 5 Mountain type (318,000 lb.); Oliver Iron Mining Co., 12 8-wheel switching (210,000 lb.); New York, Chicago & St. Louis, 6 Pacific type (250,000 lb.); Chicago, Rock Island & Pacific, 10 Mountain type (369,000 lb.) and 30 Mikado type (377,000 lb.); Buffalo, Rochester & Pittsburgh, 5 Pacific type (244,000 lb.), 9 8-wheel switching (231,000 lb.), 14 Mallet type (441,000 lb.) and 2 Mallet type (569,000 lb.); Quebec Development Co., 8 4-wheel tank (79,000 lb.) and 6 4-wheel tank (65,000 lb.).



# Examiner Admits Iron Age Quotations

## Further Hearings in Pittsburgh Basing—Federal Trade Commission Objects to Comparisons with Steel Corporation Figures

CHICAGO, Feb. 6.—Hearings in the Pittsburgh basing point case were resumed today at the offices of the Federal Trade Commission at Chicago following a recess of a week. A. V. Winter, chief clerk invoice and pricing department, Illinois Steel Co., was cross-examined on the corporation's exhibits showing a comparison of contracts for plates, shapes and bars, when reduced to a Pittsburgh base, with the next preceding Pittsburgh base quotation as published in THE IRON AGE. The contracts included all except those with car builders and those covering export business for 1908, 1910, 1911, 1912, 1914 and 1915.

Following the cross-examination, K. E. Steinhauer, counsel for the commission, filed an objection to the admission of the exhibit in evidence, but Examiner J. W. Bennett followed the previous course of procedure in the case by admitting it and taking note of the objection. The objection was on the broad grounds that the witness failed to show himself or his associates qualified to prepare the exhibit, that the exhibit is irrelevant, incompetent and immaterial and can only have the effect of deceiving and misleading the commission and clouding the issue in the case.

### Grounds for the Objection

Among the specific grounds for the objection were the following:

A very substantial tonnage covered by the contracts named a price for future delivery which is different from the price given for immediate delivery and such prices are not comparable with IRON AGE quotations for two reasons, first, the contracts do not disclose at what particular date such future delivery tonnage will be or was specified, and, second, they do not disclose how much tonnage will be or was specified at any particular date in the future.

The witness testified he could not determine from the contracts nor did he know when the steel sold for future delivery was specified or how much was specified under the future delivery prices. The contracts do not disclose whether or not protection letters had been issued against the sales, although the testimony in the case shows that the Illinois Steel Co. issues these letters to protect a customer on a price given at the date of the letter and not at the date of the contract. Yet the exhibit compares the contract prices with THE IRON AGE quotations of the date next preceding that of the contract prices with THE IRON AGE quotations of the date next preceding that of the contract which in most, if not in all, cases is subsequent to the date of the protection letters. The contracts do not disclose whether oral protections had been issued against the sales, nor does the exhibit take any cognizance of quantity discounts which would depress the contract price below THE IRON AGE quotation.

Jobbers' contracts are included, wholesale dealers' contracts are included and contracts with others whose quantity purchases have always enabled them to secure a base price at Chicago equivalent to the base price at Pittsburgh have been included, which do not disprove the adherence of the respondent's price to IRON AGE quotations after making due allowance for such discounts.

The contracts cover a substantial tonnage sold to agricultural implement manufacturers and manufacturers of railroad accessories and the evidence in this case shows that special prices are given at divers times to such manufacturers.

Most of the contracts cover a certain tonnage of plates, shapes and bars without designating how much tonnage is allotted to plates, how much to bars and how much to shapes.

In comparing the contract prices with the IRON AGE quotations, the witness could not determine how much tonnage was allotted to the different forms of steel and so he guessed the amount of each form of steel shipped and made his comparisons with the IRON AGE quotations accordingly.

Explanatory note.—In the cross examination it was brought out that if, for instance, a contract covered 5000 tons of plates, shapes and bars and the price on the bars was under the IRON AGE quotation while the plate and

shapes prices were the same, the entire tonnage would be classified as under the IRON AGE prices if in the judgment of the statistician the buyer ordinarily used more bars than plates and shapes.

Substantial tonnage covered by the contracts takes an extra charge over the base price for bars, plates and shapes and these extras do not appear on the contracts and have not been introduced in evidence.

A substantial tonnage was shipped into the Birmingham district and the witness did not know whether the prices on that material were based on the Pittsburgh base price or the Birmingham arbitrary. All tonnage sold to meet the Birmingham price should have been excluded for purposes of comparison with THE IRON AGE Pittsburgh base quotations.

A substantial tonnage covered in the contracts is never sold on the Pittsburgh plus system. Among such contracts are those covering bars for reinforcing concrete of particular design for particular customers and old rail steel bars. Certain contracts cover tonnage sold to railroad companies which specify a certain analysis which takes an added price and is not comparable with IRON AGE quotations, because the addition in price for the analysis is not disclosed by any evidence introduced in the case.

Contracts which do not specify either an all rail rate or a lake and rail rate should not have been included, because the witness testified that he could not determine from the face of the contract what rate was used. Certain contracts cover special sections which are not comparable with IRON AGE prices on bars, plates and shapes.

The contracts included in the exhibit are not as they purport to be, all of the contracts of the Illinois Steel Co. for the years mentioned outside of those specifically excepted.

### Corporation Officials Explain Prices

D. T. Buffington, district manager of sales, Illinois Steel Co., and for 20 years identified with the sales department, was called to the stand by the corporation and testified that oral protections were never granted and that except for car companies written protections did not come into vogue until about 1917, or after the period covered by the exhibit.

Counsel for the commission also filed an objection to the exhibit of the corporation comparing the prices on 748 invoices with THE IRON AGE quotations next preceding the date of the invoices and the date of the shipment. These invoices covered the period 1900 to 1921. Objection was raised because the dates of sales covered by the invoices cannot be determined from the invoices and the witness testified that he did not know the dates of sales. "For example, of the group of first seven invoices, five show on the face that the sales were made as the result of a single order or contract taking one price. The order antedated the invoices and during the interval between the orders and the deliveries covered by the invoices the IRON AGE quotations changed very materially. Yet the price was compared on the various dates of the invoices with the next preceding IRON AGE quotations and likewise on the dates of shipment. The invoices do not show when extra charges were waived nor whether protection letters or oral protection were issued covering the sales. The invoices do not disclose cases where the contract prices were cut to prevailing market prices at the date of shipment nor do they show whether the steel was sold for immediate or future delivery. The invoices show a comparison with IRON AGE quotations on two different dates, that of the invoice and that of shipment, neither of which can possibly be identified as the date of sale. The comparisons include abnormal periods such as during the years 1916 and 1920 when independent manufacturers charged a premium over the respondent for immediate delivery. In all such cases a deviation is reported when in fact the deviations are due to time of delivery."

At the close of the day the corporation offered an

exhibit covering invoices taken at random from the Illinois Steel Co. files for the same years covered by the contract exhibited, namely, 1908, 1910, 1911, 1912, 1914 and 1915. From 20 to 25 invoices were taken from the files of each month as compared with total monthly invoices averaging fully 10,000. Orders from concrete bar companies as well as those with car builders and export orders were excluded. In comparing the prices on these invoices with IRON AGE quotations

the dates on sales record cards were taken instead of the invoice dates.

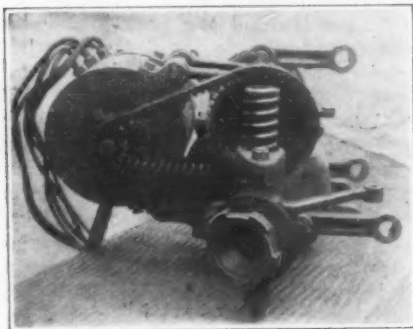
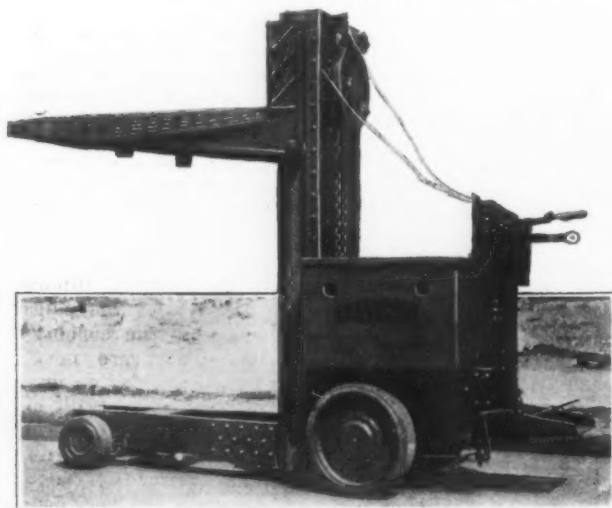
Charles Moffatt, manager statistical bureau, Illinois Steel Co., explained that the sales record card showed the date of the purchase order. Under cross-examination he stated that an interval of time might or might not elapse between the actual date of the placing of the business and the receipt of the purchase order.

## ELEVATING INDUSTRIAL TRUCK

### Platform Spring Suspension to Prevent Shocks of Uneven Roadway—Other Features

A material handling vehicle known as the Eleveyor, which may be used as an ordinary platform truck or as an elevating truck, has been placed on the market by the Eleveyor Industrial Truck Co., 56 Huntington Street, Brooklyn, N. Y. Its capacity is for 4000 lb. uniform load, and its lifting and lowering speed with this load is 70 in. in 1 1/4 min. and 70 in. in 40 sec., respectively.

Platform spring suspension, platform track construction, and parallel link drive axle suspension are outstanding features. The battery compartment is free



The Truck with Platform Elevated Is Shown Above. The arrangement of the drive motor is shown in the detail at the left

of overhead obstruction. Unusually short truck length for a given size platform is claimed.

The main side members of the frame are of rolled steel of deep section. The platform guiding uprights are designed to resist flange distortion against the platform roller pressure, and diagonal bracing of the uprights has been eliminated. The forward end of the frame is supported on two large helical springs that bear upon the drive axle. The dash and step are of one piece pressed steel and the step may be folded up when required. The platform is of one piece pressed steel, bent down at the sides and supported by two helical springs that project from pockets in supporting arms, with widely spaced rollers traveling in reinforced vertical guides. This is a patented feature and is intended to cushion the load against shocks of uneven

roadway. The platform length is 72 in., the width 38 in. and the height lowered 18 in. The height elevated is 70 in. Draw bar connection is provided in end steel bumper.

The drive gearing is housed between the two halves of the drive axle. A fully inclosed vehicle type motor of General Electric Co. design is employed and is adjustably attached by a patented method to the axle housing. From the motor the drive is through a Morse silent chain and spur gearing, the pinion and differential gear of which run in a bath of oil. SKF ball bearings are used. The drive axles are of chrome nickel steel, full floating six splined, and engage the road wheels through universal joints, the halves of which are integral with the hub cap.

A parallel link suspension, for the driving, braking and torque stresses, is made up of three links that connect the drive axle with the frame, the torque link being mounted centrally on top of the axle housing and above the other two horizontal and aligned driving links. This parallel arrangement is said to provide substantial vertical movement against the axle springs without employing a sliding pedestal box, and either wheel may ride an obstacle without injury to the frame. It is also intended to permit of compactness and easy removal of the transmission assembly. All four wheels are steered.

A motor driven chain hoist, incorporating a gyrating yoke and spur gear movement, is used to elevate the platform. Two-thirds of the lift wheel teeth are engaged continuously. The platform motion may be arrested at any point and is automatically stopped when fully up or down. The hoist is operated by a double rope control.

The truck controller is a General Electric heavy duty unit. A neutral return spring that keeps the driver's hand on the lever is incorporated.

The length of the truck overall is 128 in., and 119 in. with driver's step folded. The width is 38 in., and the height 86 1/2 in. The wheel base is 62 in. The weight without battery is 2550 lb. The speed loaded is 5 to 6 miles per hour and the speed light 6 to 7 miles. The outside and inside clearance radius is 10 ft. and 6 ft., respectively. The battery equipment is 12 cells, 19 or 21 plate Ironclad Exide or 24 cells A6 or A8 Edison. The machine is available in two models, for standard or special skid platforms.

### Price Additions Accompany Better Business

In its survey of current business, the Department of Commerce states that prices received by farmers for crops are the highest in two years, though live stock prices are the lowest in a year. The farmer purchasing power is reflected by heavily increased sales of farm implements and of the mail order houses. There is also a new high record of savings bank deposits all over the country. The seasonal slackening in manufacturing output in December did not affect woollens or copper, while unfilled orders for knit underwear at the end of December were the highest on record. Production of copper, at 103,845,000 lb., was the highest since 1920. The average price of copper made the highest record since November, 1920.

The Flint, Mich., plant of the Perkins Structural Steel Co., which began operations about two years ago, has been sold to the Massillon Bridge & Structural Co., Massillon, Ohio.



# CONTENTS

February 8, 1923

<b>Heat Treatment of Steel Castings</b> .....	<b>397</b>
Methods of Improving Physical Properties and the Bearing on Specifications— Effect on Impact Values of Electric and Open-Hearth Steel	
<b>Fuel Gas Question in Steel Industry</b> .....	<b>401</b>
Dependence Cannot Be Placed on B.t.u. Values in Comparing Fuels—Pyrometric Efficiencies and Flame Temperatures Important	
<b>To Test Flexible Provisions of Tariff Law</b> .....	<b>407</b>
Fordney-McCumber Plan of Adjusting Rates Found Difficult to Work Out— Larger Appropriations for Investigations Needed	
<b>Improving Rolling Mill Practice</b> .....	<b>411</b>
Use of Direct Current Electric Motors for Main Roll Drives Permits Proper Speed Regulation to Suit Steel Being Rolled	
<b>Examiner Admits Iron Age Quotations</b> .....	<b>421</b>
Further Hearings in Pittsburgh Basing—Federal Trade Commission Objects to Comparisons with Steel Corporation's Figures	
<b>Pig Iron Production in January</b> .....	<b>428</b>
Gain of 4604 Tons Per Day Over December—Net Gain of 9 Furnaces in Blast— Highest Rate Since October, 1920	
Dates of Foreign Trade Convention .....	419
Changed .....	400
Baking Enamel .....	406
Coke Production Increases .....	406
Steel Corporation's Accident Prevention ..	406
Electric Power Club to Meet in June .....	406
Truck Loader Mounted on Tractor .....	408
Cast Steel Instead of Forged Anvils .....	408
Detroit Employment Record .....	408
Increased Exports from Liverpool .....	408
Deflation in Farm Machinery Prices .....	408
Report of Bureau of Standards .....	408
Rolling Mill Developments .....	409
New Case Hardening Method .....	410
Plans for Machinery Exports .....	414
New Bath Internal Thread Micrometer ..	415
Safety Cupola Tapper and Stopper .....	415
Steel Used in Locomotives .....	416
Trend of Prices of Commodities .....	416
New Use for Sheets .....	417
Foundrymen's Association Meets .....	417
New York Steel Treaters .....	417
Survey of Buffalo Industries .....	417
Foreign Merchants Buy .....	418
New Furnace and Mill Records Made .....	418
German Market Booming .....	419
Luxemburg Iron Trade .....	419
Shipbuilding in Europe .....	419
Fabricated Steel Business .....	420
Railroad Equipment Buying .....	420
Elevating Industrial Truck .....	422
Price Additions Accompany Better Busi- ness .....	422
Editorials .....	424
Activity and Buying Power—Labor Shortage Problems—Open Shop Princi- ple Upheld—Labor in Steel Consump- tion—Heat-Treated Cast Steel.	427
Carnegie Expansion Plans at Youngstown.	442
Continental Furnaces Idle .....	442
Wages and Cost of Living .....	442
Automobile Bodies and Parts .....	442
Engine Manufactures in 1921 .....	444
Stocks of Bituminous Coal .....	445
British Iron and Steel Market .....	448
Increasing Use of Metal Lath .....	448
New Trade Publications .....	449
Japanese Market Higher .....	450
Stiffened Belgian Prices .....	450
Book Reviews .....	452
Steel and Industrial Stocks .....	453
Industrial Finances .....	453
Plans of New Companies .....	454, 465
Sand Cutting Machine Exhibit .....	459
<b>Iron and Steel Markets</b> .....	<b>430</b>
<b>Comparison of Prices</b> .....	<b>431</b>
<b>Prices Finished Iron and Steel, f. o. b. Pittsburgh</b> .....	<b>443</b>
<b>Prices of Raw Materials, Semi-Finished and Finished Products</b> ..	<b>444</b>
<b>Non-Ferrous Metal Market</b> .....	<b>445</b>
<b>Personal Notes</b> .....	<b>446</b>
<b>Obituary Notes</b> .....	<b>447</b>
<b>Machinery Markets and News of the Works</b> .....	<b>455</b>
<b>New York Jobbers' Prices</b> .....	<b>466</b>

ESTABLISHED 1855

# THE IRON AGE

EDITORS:

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Member of the Audit Bureau of Circulations and of  
Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President*

PRINTED IN U. S. A.

George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building

Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.  
Subscription Price: United States and Possessions, Mexico, Cuba, \$6.00; Canada, \$8.50; Foreign, \$12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

## Activity and Buying Power

Business reviews of the past few years, when endeavoring to prognosticate the degree of trade activity, or "prosperity," have dwelt much upon "needs," both of foreign countries and of our own. During the war much was said of banked-up demand for steel throughout the world. There was much lost time to be made up and what might amount to a famine in steel was likely to result. Since the armistice there has been much analysis of trade prospects along the same line.

There has been a strong disposition to emphasize the matter of "needs" and to pass lightly over, or ignore entirely, the question of buying power. This is not the safe and sane viewpoint. Years ago the custom was different. We may still be economically illiterate, more or less, but it is a fact that in the last decade of the old century and the first decade of the new, business men and review writers recognized clearly the importance of buying power as a foundation for trade activity and prosperity. In 1897 and 1898, for instance, toward the close of a so-called depression, very little thought was given to "needs," real or imaginary. It was recognized that men would spend all they could afford to spend, and the keynote of the business prospect was that large numbers of workmen were not idle then as in 1894 and 1896 and business houses were not experiencing the large losses that characterized those years.

Needs are much the same now as they were in 1920, a year of great activity, and in 1921, a year of small activity. The situation as to buying power has greatly improved lately. We have today the best outlook there has been for a long time. There is full employment and wages are rather high. All classes of workmen have money and it may be taken for granted they will spend it. The cost of living is high. It nearly always is. One must have a short memory to assume that high cost of living is a new thing, a purely post-war phenomenon. There was much complaint of the high cost of living in years before the war.

The condition of employers has likewise improved. In general, profits are probably not what they should be, but in practically all cases they have been improving. The large losses that fol-

lowed the recent boom have been liquidated and for months past profits have been increasing, while there are few lines of business that do not promise greater profits in the first half of this year than were secured in the second half of last year.

The combination of full employment and good wages for workmen and of profits for business houses makes a large buying power and the buying power makes trade activity and prosperity. The ability to satisfy needs now exists. There is no danger either of lack of needs or lack of buying power. The situation is good. The possible dangers are of another character. Workmen may not be content with their wages and may strike or may refuse to do good work. Sellers may advance their prices unduly. These dangers always exist when trade is good. When it is bad, they disappear. Their existence is valuable proof that the present business situation is a favorable one.

## Labor Shortage Problems

As the end of the present session of Congress rapidly approaches, it is clear that there will be no legislation in regard to immigration prior to March 4. It likewise seems highly probable that there will not be an extra session of Congress and that when Congress does meet next December, unless there is a decided change of sentiment in the meantime, the prevailing policy will be one of selective immigration. Whether the census of 1890 (which shows relatively small percentages of nationalities which are assimilated slowly—nationalities which supply needle working and peddling trades) or that of 1910 is used as a basis, there is little promise of increasing the supply of labor needed by the iron and steel and other industries.

With this prospect of rigid limitation of immigration for a long time, the question of how labor can be made more efficient is one of increasing importance to the country. Ethelbert Stewart, chief of the Bureau of Labor Statistics, has recently analyzed the problem in a very impressive manner. He cites the fact that in the coal industry 700,000 men are idle more than half of their time and he estimates that if 25 per cent of the higher



type of coal mines operated 306 days in the year, employing 60 per cent of the men now in the industry, they would produce all the coal the United States could use or export. Mr. Stewart also says that a study of payroll data in the manufacturing industries, which usually employ 10,000,000 to 11,000,000 people, indicates unemployment equal to twelve months for from 1,500,000 to 1,750,000. This does not mean that that large number is idle for a full year, because a larger number are idle for a part of the year, and the distribution of waste is spread over the entire 11,000,000.

Another important fact pointed out by Mr. Stewart is the difference between the efficient and the non-efficient plant. For example, there are boot and shoe factories where the production per worker per day is only two pairs of shoes and other factories in which the production for one man in a day is twelve pairs of shoes. In some saw mills the production in one man hour is 15 board feet, while in others it is 323 board feet. He does not cite any facts as to the iron and steel industry, but, of course, it is true that the number of employees in that industry could be decreased if the efficiency of men could be improved.

It is usual to suggest that workmen should be shifted from one industry to another, and that can be done, as it has in the past, to a limited extent. In the Northwest a striking example of migration from one industry to another often is furnished by the iron miners going to lumber camps and returning as they are influenced by changes in wages and weather, but it is not easy at all times to change from the kind of employment to which a man has long been accustomed and in which he is most efficient to one with which he is unfamiliar. How to bring about these changes with the least friction is a problem which will challenge the best efforts of the leaders of the great industries.

With increased acceleration the white shirt job is coming into competition with that of the overalls. The higher wage return to the manual worker in recent years has not as yet diverted large numbers from brain working pursuits, but the money difference may rise sufficiently to offset distasteful features. And further mechanical contrivances and material handling inventions may give some distinction to the lower orders of labor not now accorded mere "hewers" and "drawers," and an improvement in employer-employee relations may promise the reasonable continuity of employment and freedom from union domination desired by the white shirt type of worker.

Unless the efficiency of a vast number of employees can be increased by the leavening influence of men of varying degrees of education, through invention, cooperation and participation, and by the reduction of industrial warfare, many industries will be seriously embarrassed and the economic progress of the country will be greatly retarded.

Concrete evidence of the magnitude of the American electric brass melting industry is contained in the recent publication by the Bureau of Mines of a bulletin of 334 pages. It is remarkable that an industry which in its commercial phase is

only about six years old should be able to furnish the substance for so large a treatise. Not only are all the furnace types described and discussed but the advantages of electricity as a melting medium for non-ferrous metals are clearly set forth. The analysis shows that on Jan. 1, 1922, or a year ago, there were 413 furnaces in active commercial use, having a capacity of 233.7 heat tons and a total kilowatt draft of 50,861. The prediction of the late Dr. Joseph W. Richards in 1919 that "it will be but a short time before all the brass in this country will be melted by electric furnaces" is rapidly reaching fulfillment. Electric brass melting has easily surpassed the notable developments in electric steel melting. A signal service to the advancement of metallurgy has been rendered by the bureau and the authors in the publication of this report.

### Open Shop Principle Upheld

The Supreme Court of Massachusetts has finally established for the State, and as a precedent to guide litigation in other States, the principle that an employer has a right to discharge his men if they will not sign individual contracts to give up membership in a union, and that if such discharged employees combine to picket his plant or interfere with his place of business for the purpose of compelling him to take them back under the old employment relations, he is entitled to restrain such interference by injunction.

The issue involved has been in dispute for years. The non-union employment policy is now upheld, and the doctrine is emphasized that so long as an employee has the unquestioned right to enter into or remain in the employment of such firms only as he desires, and on whatever terms he considers satisfactory to himself, the employer has the same right to hire or retain in his employment only such men as are willing to work on terms that are satisfactory to the employer. Once having entered into the contract of employment, no outsider has a right to interfere with either party for the purpose of causing the contract to be broken, or to interfere with the enforcement of it. Such is the essence of the Massachusetts decision.

The case in point is that of the Moore Drop Forging Co. of Springfield vs. the Springfield Central Labor Union. The facts were these: The company, all of its employees being union members, requested them to sign contracts which provided that while employed they would not be or become members of any trade union. The employees who refused to sign the contract were discharged, others struck in protest, and all combined together to carry on various activities against the company to compel it to abandon the contracts of employment.

Later, after the company had filled the places of the striking and discharged employees, and had resumed its accustomed normal operation, the Central Labor Union of Springfield took up the conflict, and it was against interference from this source that the action was brought in the Supreme Court. That tribunal establishes the unqualified right of the employer to prescribe the terms of his

relations with his workers in respect to their affiliations with labor unions. The decision reads:

The plaintiff was entitled to make it a condition that those entering its employment should not be or become members of a labor union, and is entitled to be protected by the law and to receive whatever benefits may accrue from such a contract. The right of one to have the benefit of his contract is a right which can lawfully be interfered with only by one who is acting in the exercise of an equal or superior right which comes in conflict with the other. The members of the Central Labor Union had no right to interfere with the plaintiff's business for the illegal purpose of forcing it to abandon the making of individual contracts with its employees.

There is no Massachusetts statute which makes illegal the so-called "peaceful picketing." The decision probably could not be interpreted as applying to picketing in the actual progress of a strike, so far as such picketing is permitted under the statutes. The importance of the decision is not so much in the matter of interference in itself, as in the establishing of a broad principle of the employer's rights in demanding that his workers shall not be members of a labor organization to the principles and practices of which he objects. It goes beyond the open shop as ordinarily established, where no distinction is made between union and non-union men, so long as union rules and interference do not prevail. Under its findings a shop may be made out and out non-union, and the outsider has no right to interfere. In other words, the employer is given equal privilege with the employee.

### Labor in Steel Consumption

Scarcity of labor is often referred to in trade reports as a factor in limiting the production of steel, while it is seldom mentioned from the viewpoint of the consumption of steel. On the whole, however, the latter is more important than the former. Distinction, of course, must be made between a shortage of workers in general and a shortage in a particular class of labor. There might be, for instance, a shortage of nail makers and a plethora of carpenters.

In general, however, a shortage of labor, that is, a desire on the part of some men to spend more money than other men are willing to work for, is certain to affect the consumption of steel. A great deal of work has to be done when steel is consumed or put into employment, not merely the work put upon the steel being involved, but also the attendant work. In a dwelling house the plumber who installs the pipe must wait until the other artisans have done certain things. There is work between the steel mills and the hardware ready for installation and doors, sash, etc., must also be made. The automobile industry, which uses a great deal of steel, requires many materials, the furnishing of which involves much labor. It may be said that rails, on the other hand, involve but little labor in the laying, yet as an actual fact a railroad that is short of labor is likely to defer rail replacements and employ its available labor in some other way.

As a rough estimate, it may be said that in producing the average steel mill product and including the mining of ore and coal and making of coke, but omitting the work of transportation,

from 60 to 70 net tons a year of finished steel product is shipped from mill for each man employed in the general industry, and this is really a large quantity. On the other hand, there is little work done in the country that is not connected at one point or another with the consumption of steel.

Were it not for the human element the relation between steel production and its consumption would be more or less apparent. As it is, when the buyer of steel is confronted with conditions that make it impossible for him to fabricate or employ steel as rapidly as he wishes he is at the same time fearful that he may not receive full supplies in future and is disposed to build up stocks. A shortage of labor in the factory is unlikely to cause the management to suggest to the mill that shipments should be discontinued, unless eventually the stock becomes quite large. Thus the demand for steel as it can be observed is not quickly influenced by labor shortage.

The wage rates actually paid by steel mills affect the market price of steel, but it hardly can be said that a general labor shortage will have a tendency in the long run to enhance steel prices. It will affect the consumption of steel as well as its production. With a larger labor supply there would be greater consumption of steel and it is possible that the production would not increase in equal proportion.

### Heat-Treated Cast Steel

Some idea not only of the progress which has been made in the heat treatment of steel castings but also of the variety of properties possible from the same casting is afforded by a discussion on other pages of this issue. The lay reader cannot help but be impressed with the strides that have been made; to some of those who have been out of intimate touch with the industry for a few years, the developments are striking.

As representative of the general average of castings the discussion covers two heats. By the application of plain annealing, air cooling and double heat treatment, the variation in properties is delineated and some of the dangers outlined. In strong contrast stands the practice of only a few years ago when either there was no heat treatment at all or only a simple annealing followed by cooling in the furnace. This in many cases was unscientifically and superficially carried out. According to the then crude practice, only one set of properties was possible of attainment and these were uncertain or at least non-uniform as to castings and heats. The idea of air cooling, with its manifestly beneficial results, was often frowned upon.

There has been some measure of justification for the conservatism which has prevailed. The application of the principles of heat treatment to steel castings is not so universally easy as it is to forging and rolled products, because of the nature of the castings themselves and the limitations which their design imposes. But judicious use of some of the present-day heat treatment methods makes it possible to bring out the full measure of the possibilities of the metal and to adopt some



castings to uses not hitherto thought possible. The application of modern heat treatment to alloy steel castings, particularly those made electrically, has made this phase of the foundry industry what it is to-day.

Exports of iron and steel scrap from France have been prohibited as of Jan. 1, 1923, according to the London *Ironmonger*, except for use in Italy. These refer to material for use in re-melting into steel. The exports attained a volume of no less than 791,823 tons in the first half of 1922, compared with 547,645 tons for all of 1921. A shortage has resulted and prices have advanced. By the acquisition of Lorraine, France has a much increased need for scrap in steel-making plants as well as in blast furnaces. The extent to which Germany likewise has been depending on scrap is measured by import statistics for the first ten months of last year, which show receipts at the unprecedented total of 496,000 tons. Besides having concern over its own scrap supplies, France naturally cannot be expected to look with indifference at Germany's acquiring portions of the dwindling volume.

A feature of the British foreign trade in iron and steel last year was the recovery in galvanized sheet exports. December shipments were 47,900 tons and the average for the year 42,730 tons per month. This exceeds any post-war record and compares with 54,900 tons and 63,500 tons per month in 1912 and 1913 respectively. American export trade in this product presents a contrast. In 1913 our exports of galvanized sheets were 9500 tons per month. For the first eleven months of last year they averaged 9300 tons per month. Thus not only has the movement attained practically the pre-war volume but also galvanized sheets stand out as one of only two products that have regained pre-war status.

### High Rate of Operations of Wheeling Steel Corporation

WHEELING, W. VA., Feb. 5.—Top Mill furnace, Wheeling Steel Corporation, goes into blast on Wednesday and will leave that interest with only one of its five furnaces in this district idle, the small Belmont furnace in this city. Both LaBelle stacks at Steubenville are in blast. Of the 15 blast furnaces in this district, 10 will be making iron this week. Three of the four stacks at the Mingo, Ohio, works and one of the two at Bellaire, Ohio, works, Carnegie Steel Co., are in blast, as are both furnaces of the National Tube Co., Riverside Works, Benwood, W. Va. Stack of the Weirton Steel Co., was blown out Jan. 20, for relining.

Steel works schedules for this week reflect a high rate of operations. The schedule is as follows:

Wheeling Steel & Iron Co.—Benwood plant, 75 per cent; Belmont plant, 65 per cent; Top Mill Furnace, to blow in Feb. 7; Martins Ferry Furnace, in blast; Yorkville plant, 50 per cent.

Whitaker-Glessner Co.—Wheeling Mills, 95 per cent; Martins Ferry Mills, 95 per cent; Beech Bottom plant, 95 per cent; Portsmouth plant, 100 per cent.

LaBelle Iron Works—Steubenville plant, 90 per cent; Wheeling plant, 95 per cent.

National Tube Co.—Riverside plant, Benwood, 100 per cent.

American Sheet & Tin Plate Co.—Laughlin plant, Martins Ferry, 87 per cent; LaBelle plant, Wheeling, 100 per cent; Aetna-Standard, Bridgeport, Ohio, 100 per cent.

Carnegie Steel Co.—Bellaire works, 75 per cent; Mingo Junction works, practically full.

## PRICES ADVANCING

### Shortage of Semi-finished Steel at Youngstown an Important Factor

YOUNGSTOWN, Feb. 6.—Sheet prices are being established at 2.75c. for blue annealed, 3.60c. for black and 4.75c. for galvanized grades by leading Valley interests on new tonnages. The Youngstown Sheet & Tube and Republic companies have formally advanced standard merchant pipe \$4 per ton and oil country goods \$6. In merchant bars, business has been offered a district interest at 2.15c.

Growing shortage of semi-finished steel is responsible in some measure for the stiffening in quotations in the finished steel market. Sheet bars are not available in some cases even at \$40, though contract tonnages of course are moving at a lower level. Few actual sales of semi-finished steel are therefore being made because of the large requirements of makers in their own finishing departments and also of the fact that surplus tonnage is already engaged. One independent has already curtailed in its sheet department because of steel shortage.

Recent inquiries involving in excess of 25,000 tons for sheet bars have made their appearance, but have met little response.

Second quarter tonnage in finished lines is being negotiated by some of the more important consumers.

### Carnegie Steel Co.'s Plans for Expansion at Youngstown

YOUNGSTOWN, Feb. 6.—In a program of expansion now under consideration, the Carnegie Steel Co. contemplates erection of two additional blast furnaces, from 10 to 12 open-hearth furnaces and more bar mills in the Youngstown district. A decision on the expansion plans may be expected within a month. No appropriation has yet been made for the additional capacity, however.

In its Ohio Works group at Youngstown, the Carnegie company now operates six large, modern blast furnaces and 15 open-hearth furnaces. It has a total of 17 bar mills in this territory, divided between the Upper and Lower Union mills at Youngstown and the McDonald bar mills in Trumbull county.

The original layout for the McDonald plant, which called for nine bar mills, has never been completed, but five having been installed.

### Order from Spain for Rolling Mill Equipment

PITTSBURGH, Feb. 6.—Belief that German manufacturers would be unable to make delivery on account of the situation in the Ruhr was largely responsible for a large order for rolling mill equipment coming to this country. The Siderurgica Del Mediterraneo, Sagunta, Spain, has just placed with the Westinghouse Electric & Mfg. Co. an order for electrical apparatus to operate a 40-in. reversing blooming mill, a 28-in. structural mill and a 36-in. by 111-in. 3-high plate mill.

According to a message received from St. Johns, N. F., the Wabana iron mines of the British Empire Steel Corporation at Bell Island will be re-opened some time this week. Operations will be started with the full complement of 2000 men recently laid off owing to complications arising from the Franco-German trouble in the Ruhr.

The Hoosier Rolling Mill Co., Terre Haute, Ind., has changed its name to the Hoosier Steel Works of the Consolidated Steel & Iron Corporation. No change will be made in personnel.

## JANUARY IRON OUTPUT

### Gain Last Month 4604 Tons Per Day as Compared With December

#### Thirteen Furnaces Blown In and Four Blown Out or Banked—Net Gain of 9

A moderate gain over December was recorded in January in the pig iron production of the country. It was not enough, however, to change the comparisons made a month ago and the record made in October, 1920, still stands as the largest up to this time. The January gain over December was slightly larger than the December gain over November, or 4604 tons per day compared with 4587 tons per day in December over November. The gain in furnaces blown in was two less than a month ago, or 9 instead of 11.

Production of coke and anthracite pig iron for the 31 days in January amounted to 3,229,604 tons, or 104,181 tons per day as compared with 3,086,898 tons, or 99,577 tons per day in December, also a 31-day month. This represents a gain of 142,706 tons over December as compared with 237,195 tons for December over November and 211,859 tons for November over October.

The total number of furnaces in blast on Feb. 1 was 262 as compared with 253 on Jan. 1. There were 13 furnaces blown in last month and 4 blown out or banked. The capacity of the 262 furnaces in blast the first of this month is estimated as 105,125 tons per day as compared with 101,400 tons per day for the 253 furnaces in blast Jan. 1. This is an increase of 3725 tons per day.

The manganese-iron alloy production in January of 31,414 tons is the largest since March, 1921, when it was 41,294. The ferromanganese output of 19,358 tons was also the largest since March, 1921.

#### Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from January, 1922, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons			
	Steel Works	Merchant	Total
January, 1922	42,130	10,933	53,063
February	46,827	11,387	58,214
March	53,547	12,128	65,675
April	56,930	12,140	69,070
May	60,619	13,790	74,409
June	62,534	16,167	78,701
July	62,295	15,297	77,592
August	45,672	12,914	58,586
September	53,856	13,935	67,791
October	66,060	19,032	85,092
November	72,177	22,813	94,990
December	75,179	24,398	99,577
January, 1923	79,991	24,190	104,181

#### Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production":

Production of Steel Companies—Gross Tons				
	Total Production		Spiegeleisen and Ferromanganese	
	1922	1923	1922	1923
Jan.	1,306,045	2,479,727	Fe-Mn Spiegel	Fe-Mn Spiegel
Feb.	1,311,170		6,874	1,230
Mar.	1,629,982		3,610	4,980
Apr.	1,707,902		11,600	2,095
May	1,879,180		14,998	4,211
June	1,876,033		15,432	4,902
July	1,931,138		18,273	4,817
Aug.	1,415,832		18,873	7,176
Sept.	1,615,696		11,402	7,925
Oct.	2,047,873		10,681	4,235
Nov.	2,165,295		9,193	12,283
Dec.	2,330,545		13,232	4,192
Total	21,216,691		17,007	10,591
			151,175	68,587

The figures for daily average production, beginning with January, 1917, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1917—Gross Tons									
	1917	1918	1919	1920	1921	1922	1923		
Jan.	101,643	77,799	106,525	97,264	77,945	53,063	104,181		
Feb.	94,473	82,835	105,006	102,720	69,187	58,214			
Mar.	104,882	103,648	99,685	108,900	51,468	65,675			
Apr.	111,165	109,607	82,607	91,327	39,768	69,070			
May	110,238	111,175	68,002	96,312	39,394	74,409			
June	109,002	110,793	70,495	101,451	35,494	78,701			
July	107,820	110,354	78,340	98,931	27,889	77,592			
Aug.	104,772	109,341	88,496	101,529	30,780	58,586			
Sept.	104,465	113,942	82,932	104,310	32,850	67,791			
Oct.	106,550	112,482	60,115	106,212	40,215	85,092			
Nov.	106,859	111,802	79,745	97,830	47,182	94,990			
Dec.	92,997	110,762	84,944	87,222	53,196	99,577			
Year	104,619	105,496	83,789	99,492	45,325	73,645			

#### Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for January and the three months preceding:

Pig Iron Production by Districts, Gross Tons				
	Jan. (31 days)	Dec. (31 days)	Nov. (30 days)	Oct. (31 days)
New York	186,256	174,904	164,987	148,419
New Jersey	14,076	14,953	12,071	13,134
Lehigh Valley	64,457	57,892	64,889	63,635
Schuylkill Valley	85,162	79,271	71,861	66,232
Lower Susquehanna and Lebanon Valleys	40,589	37,834	36,004	32,374
Pittsburgh district	694,075	682,775	639,462	610,281
Shenango Valley	135,962	119,960	110,028	92,728
Western Penna.	152,475	153,901	127,682	116,508
Maryland, Virginia and Kentucky	76,675	83,815	70,030	54,856
Wheeling district	125,008	103,144	77,764	72,770
Mahoning Valley	345,997	343,095	321,188	302,434
Central and Northern Ohio	325,547	312,350	309,680	290,185
Southern Ohio	56,478	55,565	41,868	28,248
Illinois and Indiana	524,774	500,972	458,956	416,073
Mich., Minn., Mo., Wis. and Colo.	147,540	128,518	112,952	98,608
Alabama	232,690	218,301	209,006	210,994
Tennessee	21,843	19,648	21,275	20,365
Total	3,229,604	3,086,898	2,849,703	2,637,844

#### Capacities in Blast Feb. 1

The following table shows the number of furnaces in blast Feb. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Jan. 1:

Coke and Anthracite Furnaces in Blast					
Location of Furnaces	Total Stacks	In Blast	Feb. 1 Capacity per Day	In Blast	Jan. 1 Capacity per Day
New York:					
Buffalo	22	15	6,000	14	5,760
Other New York	4	1	235	1	180
New Jersey	4	1	455	1	480
Pennsylvania:					
Lehigh Valley	18	6	2,070	5	1,725
Spiegel	2	1	140	1	140
Schuylkill Valley	15	9	2,850	8	2,555
Lower Susquehanna	9	3	1,020	3	995
Ferromanganese	1	1	55	0	0
Lebanon Valley	6	1	175	1	160
Ferromanganese	2	1	60	1	65
Pittsburgh District	55	46	21,715	46	21,445
Ferro and spiegel	4	4	670	6	675
Shenango Valley	19	10	4,385	10	3,870
Western Pennsylvania	26	13	5,000	13	5,000
Maryland	5	4	1,240	4	1,300
Ferro	1	1	90	1	150
Wheeling District	15	9	3,800	8	4,000
Ohio:					
Mahoning Valley	28	23	11,475	22	11,040
Central and Northern	26	22	10,500	22	10,430
Southern	16	7	1,785	8	1,790
Illinois and Indiana	42	32	17,000	32	16,285
Mich., Wis. and Minn.	12	10	3,585	10	3,420
Colorado and Missouri	6	3	1,175	3	1,130
The South:					
Virginia	16	4	685	4	680
Kentucky	7	3	560	1	260
Alabama	40	25	7,700	24	7,365
Tenn., Ga. and Texas	16	7	700	6	600
Total	418	262	105,125	253	101,400

#### Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of the daily average production by months of coke and anthracite iron. The dotted curve on the chart rep-



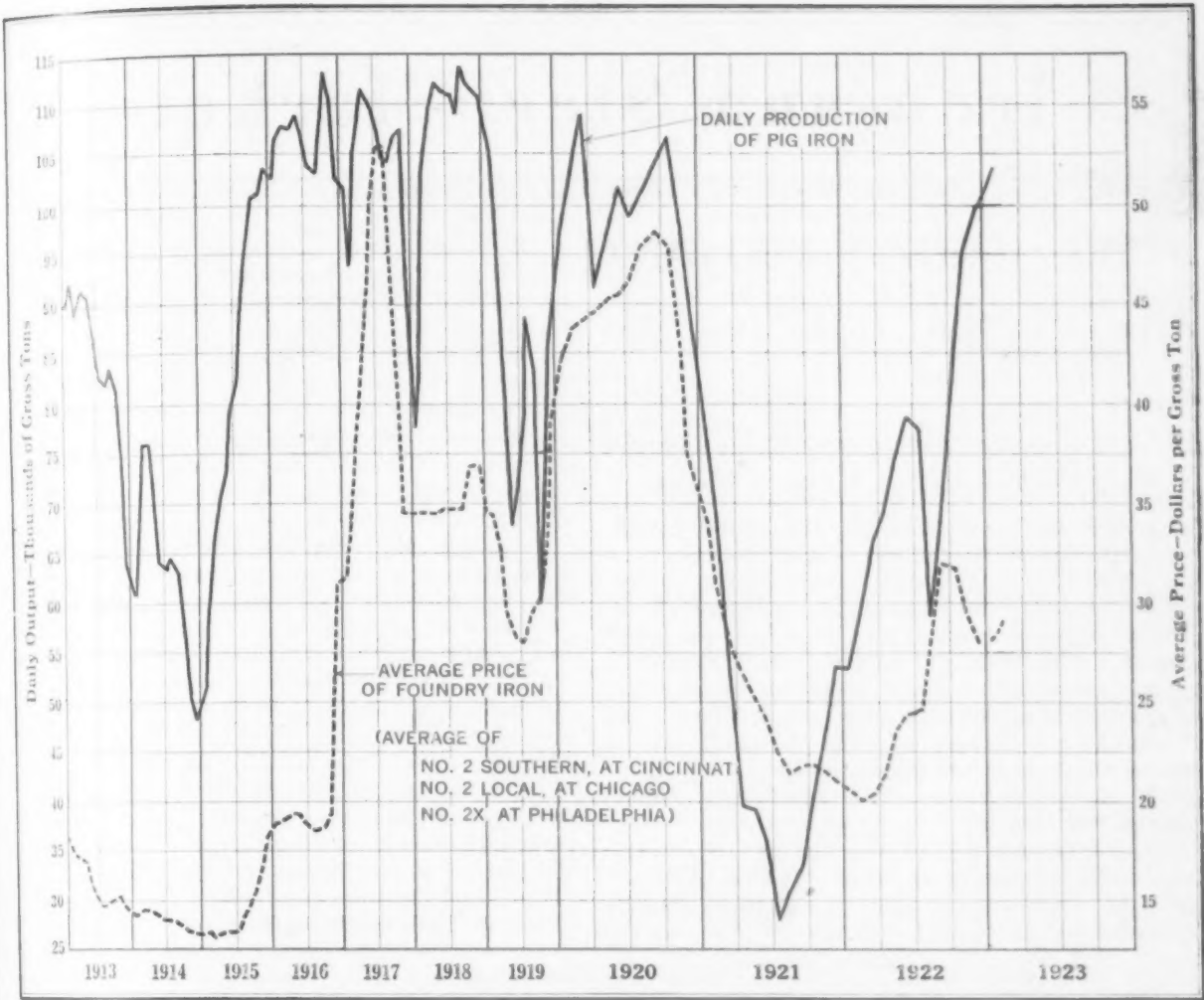


Diagram of Pig Iron Production and Prices

resents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1919—Gross Tons					
	1919	1920	1921	1922	1923
Jan. ...	3,302,260	3,015,181	2,416,292	1,644,951	3,229,604
Feb. ...	2,940,168	2,978,879	1,937,257	1,629,991	.....
Mar. ...	3,090,243	3,375,907	1,595,522	2,035,920	.....
Apr. ...	2,478,218	2,739,797	1,193,041	2,072,114	.....
May ...	2,198,056	2,985,682	1,221,221	2,306,679	.....
June ...	2,114,863	3,043,540	1,064,833	2,361,028	.....
1/2 year...	16,033,808	18,138,986	9,428,166	12,050,683	.....
July ...	2,428,541	3,067,043	864,555	2,405,365	.....
Aug. ...	2,742,388	3,147,402	954,193	1,816,170	.....
Sept. ...	2,487,965	3,129,323	985,529	2,033,720	.....
Oct. ...	1,863,558	3,292,597	1,246,676	2,637,844	.....
Nov. ...	2,392,350	2,934,908	1,415,481	2,849,703	.....
Dec. ...	2,633,268	2,703,855	1,649,086	3,086,898	.....
Td. yr.*	20,582,878	36,414,114	16,543,686	26,880,383	.....

\*These totals do not include charcoal pig iron. The 1921 production of this iron was 94,780 tons.

Among the furnaces blown in during January were the following: Buffalo C furnace of the Hanna Furnace Co. in the Buffalo district; Hokendauqua furnace of the Thomas Iron Co. and A furnace of the Bethlehem Steel Co. in the Lehigh Valley; the third Swede furnace in the Schuylkill Valley; Vesta furnace of E. J. Lavino & Co. in the Lower Susquehanna Valley; No. 2 Ashland furnace and the Norton furnace in Kentucky; No. 1 Bellaire furnace of the Carnegie Steel Co. and the second LaBelle furnace in the Wheeling district; No. 1 Hubbard furnace of the Youngstown Sheet & Tube Co. in the Mahoning Valley; No. 2 Gary furnace in the Chicago district; No. 3 Bessemer furnace of the

Tennessee Coal, Iron & Railroad Co. in Alabama, and the Johnson City furnace in Tennessee.

Among the furnaces blown out or banked during January were the following: D furnace of the Bethlehem Steel Co. in the Lehigh Valley; the Weirton furnace in the Wheeling district; the Milton furnace in southern Ohio, and No. 1 Gary furnace in the Chicago district.

Blast Furnace Notes

Blast furnace "Henry" of the Ford Motor Co. broke all its previous tonnage and coke records for high silicon iron during the month of January. Details of the record were: Average tonnage, 514 gross tons per day; coke per ton of iron, 2015 lb.; average silicon, 3.46 per cent; average scrap and borings charged, 12 per cent; slag volume, 830 lb. per ton of iron.

Of the 13 furnaces blown in during January 3 were Steel Corporation furnaces, 5 were independent steel company furnaces and 5 were merchant furnaces. Of the 4 furnaces blown out or banked 1 was a Steel Corporation furnace, 2 were independent steel furnaces and 1 was a merchant furnace.

Fire at American Steel Foundries Plant

A fire on Feb. 4 destroyed six bays in the middle of the Indiana Harbor, Ind., plant of the American Steel Foundries. The conflagration broke out in the core room and was caused by a break in an oil line. The open-hearth furnaces were not damaged and operations will be resumed next week at both ends of the plant. The cranes, however, will be unable to operate the length of the plant, owing to damage to the runways.

# Iron and Steel Markets

## STEEL MARKET BUOYANT

### Advances in Plates, Shapes, Bars, Pipe and Wire

#### Pig Iron Comparatively Quiet—High January Output—Europe Out of Export Market

It is difficult to describe the steel situation without picturing it as gathering strength with dangerous rapidity. A rather general change of consumer attitude, now seeking a hastening of deliveries or an increase in size of orders, has given rise to a wide variety of prices in bars, plates and shapes, but an impression is abroad that the market is crystallizing toward a 2.25c. per lb. basis. All interests, with lessons of 1920 in mind, show a desire not to let things get out of hand.

There are mills in a position to take second quarter business, but they see no advantage in making commitments before the end of the month. Meanwhile, consumers are finding it difficult to satisfy the increased demands of secondary buyers. Appearances still are that demand is for current needs, and that few opportunities have been afforded for speculative purchases.

Semi-finished steel has developed a firmness even more pronounced than finished steel. Steel Corporation absorption over five months of large amounts of ingots, billets and sheet bars, with the American Sheet & Tin Plate Co. and the National Tube Co. still unsatisfied, has been a chief factor. Fewness of sales makes for indefiniteness of price, but indications are that billets are now a minimum at \$40.

Wire at 2.55c. a lb., Pittsburgh, or \$2 a ton higher, steel pipe \$4 up, steel bars and beams at 2.15c. or \$1 a ton higher and steel plates at 2.20c. or \$2 up, put THE IRON AGE composite price for finished steel at 2.56c., the highest point since the end of June, 1921. A week ago the composite was 2.489c., and a year ago, 2.019c.

The high rate of construction activity is shown by the week's awards of 52,500 tons in steel buildings and new projects requiring 42,000 tons.

The sustained consumption of the oil industry for pipe lines and tanks has helped to put plates outstanding in current demand. Following the large buying of recent weeks, additional tanks taking 20,500 tons were contracted for and new ones have appeared involving 20,000 tons. A 700-mile pipe line purchase took 70,000 tons and oil country pipe has been advanced \$6 per ton.

Railroad equipment buying remains also conspicuous. Car orders total 1705, locomotive orders 138 with the American Locomotive Co. alone, and new car inquiries 5400.

Two bar orders for bolt and nut manufacture require 7000 tons for April delivery.

Automobile companies in Detroit and immediate territory are now on a production schedule of close to 11,000 cars per day, including 5800 at the Ford plant, which in addition is making 400 tractors daily.

Farm implement makers are pressing for bars with indications that they will have to be satisfied with second half delivery on a large part of the material they are buying.

With the fuel and labor shortage restrictions besetting the steel trade, the remarkable fact is that production is so large, the Steel Corporation, for example, now operating at fully 90 per cent of capacity. And this week the Republic, Wheeling and McKinney steel companies each put a blast furnace into operation.

January pig iron production, 3,229,604 tons, made as good a gain over December as that month did over November. The daily average output was 104,181 tons, against 99,577 tons for December and 94,990 tons for November.

There were 262 furnaces in blast on Feb. 1, a net gain of 9, 253 furnaces being active on Jan. 1, and 13 going in and 4 going out. The rate of production on Feb. 1 was 105,125 tons per day.

The pig iron market is not so strong as that for finished materials. Buyers, hoping that lower prices will result from reductions in fuel costs, are not placing orders freely, but the decline in prices of coal and coke has been slight and there is considerable uncertainty as to whether there will be a decided trend downward. Steel companies are not expected to be active competitors in the merchant market. The principal inquiry of the week has been for basic, an Eastern steel company being in the market for 10,000 tons and an Ohio company for 5000 tons.

The latest effect of the Ruhr siege has been the withdrawal of export quotations in France, Belgium and Luxemburg, as well as in Germany. Germany is cancelling French and Belgian contracts. Four more blast furnaces have been blown out in France, Belgium and Luxemburg, three have been banked and two more are about to go out. In England two furnaces have been added to the active list. A large electrical mill equipment order for a steel plant at Sagunta, Spain, has been placed in Pittsburgh.

## Pittsburgh

### Acute Shortage of Semi-Finished Material—Steel Corporation Purchases Heavy

PITTSBURGH, Feb. 6.—Strength of an even more pronounced sort than is seen in finished steel prevails in semi-finished material, on which there is a very acute shortage at present. Big purchases of ingots, billets and sheet bars by the Steel Corporation over the past five months, coupled with the fact that those who sold did not sense a demand for finished products of such huge proportions as has come to them since the middle of December, provide the explanation. Known purchases of semi-finished material by the Steel Corporation in the past five months have aggregated no less than 192,500 tons, of which the National Tube Co. has taken 132,500 tons and the American Sheet & Tinplate Co. 60,000 tons. The latter has not yet received all of the tonnage purchased and this accounts for a fresh inquiry from that source amounting to 25,000 tons. The National Tube Co. is still in the market, despite its recent big purchases of Bessemer billets, and will take either more billets or skelp. A real scramble to



## A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Feb. 6, 1923	Jan. 30, 1923	Jan. 9, 1923	Feb. 7, 1922
No. 2X, Philadelphia†...	\$29.76	\$29.76	\$29.76	\$21.34
No. 2X, Valley furnace†...	27.00	27.00	27.00	19.00
No. 2, Southern, Cin. tit.†	28.05	28.05	27.05	20.00
No. 2, Birmingham, Ala.†	24.00	24.00	23.00	15.50
No. 2, foundry, Chicago*	29.50	29.50	29.00	18.50
No. 2, foundry, eastern Pa.	28.00	28.00	28.00	19.84
Basic, del'd, eastern Pa.	25.50	26.00	26.00	17.75
Basic, Valley furnace...	29.52	29.27	29.27	19.50
Bessemer Valley, del. P'gh	29.50	29.50	29.00	18.50
Malleable, Chicago*	27.00	27.00	27.00	19.00
Malleable, Valley...	28.27	28.27	28.27	20.96
Gray forge, Pittsburgh...	33.15	33.15	33.15	30.50
L. S. charcoal, Chicago...	107.50	107.50	102.50	58.35
Ferromanganese, furnace...				

Rails, Billets, Etc., Per Gross Ton:	Feb. 6, 1923	Jan. 30, 1923	Jan. 9, 1923	Feb. 7, 1922
O-h. rails, heavy, at mill...	\$43.00	\$43.00	\$43.00	\$40.00
Bess. billets, Pittsburgh...	38.50	38.50	36.50	28.00
O-h. billets, Pittsburgh...	38.50	38.50	37.50	28.00
O-h. sheet bars, P'gh...	39.50	39.50	37.50	29.00
Forging billets, base, P'gh.	45.00	45.00	43.00	32.00
O-h. billets, Phila...	45.17	45.17	42.17	33.74
Wire rods, Pittsburgh...	47.50	47.50	47.50	36.00
Skelp, gr. steel, P'gh, lb.	2.10	2.10	2.00	1.50
Light rails at mill...	2.15	2.15	2.15	1.50

Finished Iron and Steel,	Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.475	2.475	2.325	1.81	
Iron bars, Chicago...	2.35	2.35	2.35	1.60	
Steel bars, Pittsburgh...	2.15	2.10	2.00	1.40	
Steel bars, Chicago...	2.10	2.10	2.10	1.55	
Steel bars, New York...	2.44	2.34	2.34	1.78	
Tank plates, Pittsburgh...	2.20	2.10	2.00	1.40	
Tank plates, Chicago...	2.30	2.30	2.30	1.55	
Tank plates, New York...	2.54	2.44	2.34	1.78	
Beams, Pittsburgh...	2.15	2.10	2.00	1.40	
Beams, Chicago...	2.20	2.20	2.20	1.55	
Beams, New York...	2.49	2.44	2.34	1.78	
Steel hoops, Pittsburgh...	2.75	2.75	2.75	1.90	

\*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.  
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire,	Feb. 6, 1923	Jan. 30, 1923	Jan. 9, 1923	Feb. 7, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.35	3.35	3.35	3.00
Sheets, galv., No. 28, P'gh.	4.35	4.35	4.35	4.00
Sheets, blue an't'd, 9 & 10	2.60	2.60	2.50	2.25
Wire nails, Pittsburgh...	2.70	2.70	2.70	2.49
Plain wire, Pittsburgh...	2.55	2.45	2.45	2.25
Barbed wire, galv., P'gh...	3.35	3.35	3.35	3.15
Tin plate, 100-lb. box, P'gh.	\$4.75	\$4.75	\$4.75	\$4.75

### Old Material,

Per Gross Ton:	Feb. 6, 1923	Jan. 30, 1923	Jan. 9, 1923	Feb. 7, 1922
Carwheels, Chicago...	\$27.00	\$27.00	\$27.00	\$15.00
Carwheels, Philadelphia...	24.00	24.00	21.00	15.00
Heavy steel scrap, P'gh...	22.50	22.00	22.00	13.50
Heavy steel scrap, Phila...	20.00	20.50	19.00	12.00
Heavy steel scrap, Ch'go...	19.75	19.75	19.00	11.25
No. 1 cast, Pittsburgh...	24.00	24.00	23.00	16.00
No. 1 cast, Philadelphia...	24.00	24.00	23.00	16.50
No. 1 cast, Ch'go (net ton)	23.00	22.50	21.50	13.00
No. 1 RR. wrot., Phila...	24.00	23.00	21.50	14.50
No. 1 RR. wrot, Ch'go (net)	18.00	18.00	18.00	10.50

### Coke, Connellsville,

Per Net Ton at Oven:	Feb. 6, 1923	Jan. 30, 1923	Jan. 9, 1923	Feb. 7, 1922
Furnace coke, prompt...	\$7.50	\$8.00	\$7.75	\$2.75
Foundry coke, prompt...	8.50	9.00	8.50	3.75

### Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	15.12½	15.12½	14.75	13.50
Electrolytic copper, refinery	14.75	14.75	14.50	13.25
Zinc, St. Louis...	7.05	7.12½	7.00	4.50
Zinc, New York...	7.40	7.47½	7.35	4.85
Lead, St. Louis...	8.10	8.10	7.25	4.40
Lead, New York...	8.10	8.20	7.50	4.70
Tin (Strait), New York...	40.12½	40.37½	38.25	32.00
Antimony (Asiatic), N. Y.	7.12½	7.12½	6.60	4.40

### Composite Price, Feb. 6, 1923, Finished Steel, 2.560c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	{	Jan. 30, 1923, 2.489c.
	{	Jan. 9, 1923, 2.446c.
	{	Feb. 7, 1922, 2.019c.
These products constitute 88 per cent of the United States output of finished steel	{	10-year pre-war average, 1.689c.

### Composite Price, Feb. 6, 1923, Pig Iron, \$26.63 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	{	Jan. 30, 1923, \$26.88
	{	Jan. 9, 1923, 26.63
	{	Feb. 7, 1922, 18.10
	{	10-year pre-war average, 15.72

secure semi-finished steel is observed and while actual prices are somewhat indefinite because so few sales are being made, there is much doubt whether any form of semi-finished steel can be bought for less than \$40.

The pig iron market which has been laggard in comparison with the steel market, and actually has weakened slightly in the past week on basic grade, is expected to be helped at least on the steel making irons by the shortage of steel. Steel makers who have been "cutting the cloth" for merchant producers now are likely to have little, if any, iron for market sale and this means that those who have to buy iron will be more dependent on the merchant producers. The pig iron market has been dull, chiefly because buyers have expected that since there was to be no coal strike this year coke would decline and pig iron with it. Coke is getting easier, having dropped 50c. a ton in the past week, but there is some question whether really low prices will be seen so long as there is such a large iron and steel business. Furthermore, the number of furnaces in blast in this and nearby districts, with the exception of August, 1920, is the greatest on record. The Republic Iron & Steel Co., Youngstown, the McKinney Steel Co., Josephine, Pa., and the Wheeling Steel Corporation, Wheeling, W. Va., each has put on a furnace this week and there are now active 105 furnaces

out of a total of 138 in the triangle bounded by Johnstown, Pa., Wheeling, W. Va., and Warren, Ohio.

**Ferroalloys.**—Business suffers from the fact that consumers in this and nearby districts are well covered against their immediate needs, but producers are so heavily committed that the lack of activity does not affect prices. We make no change in prices.

We quote 80 per cent ferromanganese at \$100 furnace, \$107.50 seaboard, or \$112.29 delivered Pittsburgh district for domestic or British, and 76 to 80 per cent German at \$67 c.i.f. Atlantic seaboard. Average 20 per cent spiegeleisen, \$34 to \$37, furnace; 16 to 19 per cent, \$33 to \$36; 50 per cent ferro-silicon, domestic, \$82.50 to \$85, delivered. Bessemer ferro-silicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, \$45.50; 11 per cent, \$48.80; 12 per cent, \$52.10; 13 per cent, \$56.10; 14 per cent, \$61.10; silvery iron, 6 per cent, \$34; 7 per cent, \$35; 8 per cent, \$36.50; 9 per cent, \$38.50; 10 per cent, \$40.50; 11 per cent, \$43.80; 12 per cent, \$47.10. The present freight rate from Jackson and New Straitsville into the Pittsburgh district is \$3.66 per gross ton.

**Pig Iron.**—A Valley merchant producer in the past week has sold several thousand tons of basic iron at \$25.50, furnace, and for this week at least that represents the Valley market, although considerable doubt exists that more tonnage can be had at that price since the seller now is out of the market on that grade and other producers are holding at \$26. We also note

sales of approximately 1200 tons of Bessemer iron at \$27.75 for the bulk of it, and \$28 for the remainder. On this grade \$27.50 Valley has definitely disappeared and most producers now are asking \$28. Outside of this business, both sales and inquiries have been light, although one Pittsburgh district steel maker recently inquired for 3000 tons of basic, 1000 tons for immediate delivery. Hardly enough has been done in foundry iron to establish any change in prices. W. P. Snyder & Co. make the average price of Bessemer iron from Valley furnaces for January \$27.50, as against \$28.098 in December and on basic \$25.583 in January, against \$24.567 in December, these prices being based on lots of 1000 tons or over.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.77 per gross ton:

Basic .....	\$25.50 to \$26.00
Bessemer .....	27.75 to 28.00
Gray forge .....	26.50 to 27.50
No. 2 foundry .....	27.00 to 28.00
No. 3 foundry .....	26.50 to 27.50
Malleable .....	27.00 to 28.00
Low phosphorus, copper free....	35.00 to 36.00

**Semi-Finished Steel.**—Prices are very firm all along the line, with sellers fewer than buyers. The National Tube Co. still is in the market for billets and the American Sheet & Tin Plate Co. has been sounding out the market, asking prices, according to one report, for 25,000 tons. A local strip steel maker is in the market for 2000 tons of open-hearth billets and slabs and another closed within the week under review for 6000 tons of billets and slabs at \$38.50, Pittsburgh. Except for this sale, little business actually has been done because few producers have any tonnage for sale for shipment over the remainder of this quarter and are unwilling at this time to take on second quarter business. As nearly as the market can be appraised, billets are quotable at \$38.50 to \$40 for base size, and sheet bars and slabs at \$39.50 to \$40. At the moment it looks very much like \$40 for second quarter sheet bars. Forging billets do not appear readily obtainable at less than \$45 and higher prices are sought on small lots. The wire rod market is very firm at \$47.50, base, minimum, with few available, and 2.10c. now is minimum on steel pipe skelp, with some makers asking up to 2.20c. Prices are given on page 444.

**Plates.**—The Steel Corporation has named a price of 2.20c. base, Pittsburgh, on plates and this is minimum, since independents generally are asking 2.25c. and some have gone to 2.35c. Even 2.50c. is heard as a quotation for small lots for early delivery. A Government award of 14 barges to the Penn Bridge Co., Beaver Falls, Pa., calls for approximately 1400 tons of steel, mostly plates, and the Petroleum Iron Works, Sharon, Pa., has taken 25 80,000-bbl. tanks for the Texas Co., which will require 7500 tons of steel, largely plates. Prices are given on page 443.

**Structural Material.**—The Steel Corporation has gone to 2.20c. base on structural beams, and this is likely to become the market minimum, although one independent company still is naming 2.15c. base on attractive inquiries. There is also authority for the price of 2.25c. since some makers are refusing business at less. Structural shops here are getting a fair amount of business from distant points but not much in this immediate territory. Prices are given on page 443.

**Iron and Steel Bars.**—The Steel Corporation still is on the 2c. base, Pittsburgh for steel bars, but has no tonnage for delivery in this quarter and the current market is more properly quoted at 2.15c. minimum, at which sales have been made by independents, most of whom are asking up to 2.25c. on small lots. The latter price also has been made by one mill which stipulated that not less than 125 tons of a size would be taken at that figure. Iron bars are firm, with the demand helped to some extent by scarcity of steel bars for early delivery.

We quote steel bars rolled from billets at 2.10c. to 2.25c.; reinforcing bars, rolled from billets, 2.10c. to 2.25c. base; rail steel reinforcing bars, 2c. to 2.10c.; refined iron bars, 2.75c. in carloads, f.o.b. mill, Pittsburgh.

**Wire products.**—Salesmanship is an unnecessary art in the sale of wire products, since buyers are eager and

do not have to be solicited. Business is said to be too good by most makers, whose order books already are so full that they cannot take on more tonnage and hope to deliver it in time for the spring demand, since production still is low in proportion to the capacity engaged. Labor is scarce and not very efficient. Adoption of the independent wire base by the leading interest brings a single quotation on plain, annealed and galvanized wire, but there is no change in other items. It is still commented upon that the leading interest holds to \$3.35 base per 100 lb. for galvanized barbed wire in the face of its price, including extras, of \$3.25 for No. 12 gage galvanized wire, which would mean that the fabrication and spool costs are covered by 10c. per 100 lb. Independent manufacturers also claim that staples and fence prices are out of line. Prices are given on page 443.

**Steel Rails.**—Light rails, rolled from billets, still are obtainable at 2.15c. base, but the market is firm and quotations of 2.25c. base are finding a little basis in sales of small lots. Strength in the old rail market is causing a firmer stand by makers of light rails rolling them from old standard sections.

We quote 25 to 45-lb. sections, rolled from new steel, 2.15c. to 2.25c. base; rolled from old rails, 2c. to 2.10c. base; standard rails, \$43 per gross ton mill for Bessemer and open-hearth sections.

**Cold Rolled Strips.**—The market is steady and unchanged at 4.50c. base, Pittsburgh, with makers well supplied with orders and getting specifications without recourse to price concessions.

**Bolts, Nuts and Rivets.**—Rising tendency of steel prices is a stimulus to specifications and while the market on bolts and nuts and small rivets is not back to quoted discounts, concessions are smaller and less frequent than they were recently. Prices and discounts are given on page 443.

**Sheets.**—Production over the present quarter is so completely sold up that buyers are finding it very difficult to place orders for early delivery except at substantial advances over the Steel Corporation levels. Sales of black sheets by independents lately have been fairly frequent at 3.50c., base, while as much as 4.65c. has been done on galvanized, and blue annealed at 2.75c., base, is no longer unusual. Higher second quarter prices are regarded as a certainty in view of the stronger market in sheet bars and the fact that the American Sheet & Tin Plate Co. is expected to have little second quarter tonnage to sell. Prices are given on page 443.

**Cold-Finished Steel Bars and Shafting.**—Recent advance in prices has had the effect of stimulating specifications against orders previously placed and of course efforts to place tonnage at the old price. There is no evidence that business is being accepted at less than 2.65c., base, however. Ground shafting is quoted at 3.05c., base, f.o.b. mills for carload lots.

**Tin Plate.**—Shortage of steel, more especially in the West, has slightly curtailed tin plate mill operations of the American Sheet & Tin Plate Co., which last week operated at 83 per cent of capacity, due to the closing down of its American works, Elwood, Ind. Independent mills and those of the leading interest in this part of the country maintain a reasonably high rate of operation, with specifications reported to be heavy. Mills not well engaged are so because of unwillingness to sell freely at the established price.

**Tubular Goods.**—Effective Feb. 1, leading independents advanced steel pipe prices \$4 per ton on standard pipe and \$6 per ton on oil country and line pipe. The National Tube Co. adopted this change on Feb. 3. The actual advance in standard pipe is \$5.66 a ton, through the elimination of the final 2½ per cent in the supplementary discounts. The new basis to large jobbers is card, plus 1 and 5 per cent, instead of card plus 1, 5 and 2½ per cent as formerly. The effect of the price increase has been to bring a fresh avalanche of orders sent along in the hope of getting on makers' books at the old prices. Makers, however, are too well booked to accept such orders and are accepting business at the new figures only on the basis of in-



definite delivery, since the mills already are three to four months back on standard pipe and two to three months booked on lapwelded goods. The Sinclair Pipe Line Co. has placed 400 miles of 12-in. line pipe with the National Tube Co. and 250 miles of 10-in. and 100 miles of 8-in. with the Steel & Tube Co. of America. The supply situation in boiler tubes remains very tight and prices are very firm on all classes. Discounts are given on page 443.

**Hot-Rolled Flats.**—An excellent demand is reported and 2.75c., base, Pittsburgh, is so readily obtainable that makers are encouraged to ask more. The established price of last quarter of last year was 2.90c., base, and reestablishment of that base as an early probability. Except for material for cold-rolling, makers of hot-rolled strips at present are not going much below that figure. On narrow hoops of light gage the common quotation is 3.25c., base, Pittsburgh.

**Cut Nails.**—Leading makers have advanced prices \$3 per ton to \$3.15, base, per keg, f.o.b. mill for carload lots and \$3.25 for less carloads.

**Track Fastenings.**—Sales of 1000 kegs of large spikes is reported by a local maker at the new price of \$2.90 base per 100 lb. The Atlantic Coast Line Railway is in the market for 2000 kegs; it is expected that business will go to an Eastern maker. Other products under this heading are firm in price because manufacturers are so heavily obligated. Prices are given on page 443.

**Finished Steel.**—Prices still are rising. Mills are so heavily obligated that they are advancing quotations to halt buying, while buyers are raising their bids in an effort to interest the mills in their orders. The past week has brought advances in heavy tonnage products, sheets, wire and pipe, the advance in the latter being greater than indicated by the change in the discounts, because of a reduction in the preferentials given the large jobbers.

**Old Material.**—Very high prices were paid against the railroad scrap lists, heavy melting steel offered by the Pennsylvania Railroad going about \$23 per gross ton and specialties above \$25. Because of this development dealers are more bullish than ever, especially in view of the fact that just before the railroad awards were made a small tonnage of heavy melting steel was sold at \$23 delivered Midland, Pa. Larger consumers in this district give dealers little support in their price ideas, since they remain out of the market and one company has enough of a stock to last on its present practice until well into the summer. Some consumers are counting on the weakness in the East to tell on local prices, but in view of the fact that this market did not move up with either Eastern or Western markets recently, and stocks in dealers' hands are light, there does not appear to be much room for prices here to decline. We regard the market as firm, despite its dullness.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel.....	\$22.50 to \$23.00
No. 1 cast, cupola size.....	24.00 to 24.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; and Franklin, Pa. ....	23.00 to 24.00
Compressed sheet steel.....	21.00 to 21.50
Bundled sheet sides and ends...	19.50 to 20.00
Railroad knuckles and couplers...	24.50 to 25.00
Railroad coil and leaf springs...	24.50 to 25.00
Low phosphorus standard bloom and billet ends.....	26.50 to 27.00
Low phosphorus, plates and other grades.....	25.50 to 26.00
Railroad malleable.....	23.00 to 24.00
Locomotive axles, steel.....	24.50 to 25.00
Steel car axles.....	23.50 to 24.00
Cast iron wheels.....	24.00 to 24.50
Rolled steel wheels.....	24.50 to 25.00
Machine shop turnings.....	18.00 to 18.50
Heavy steel axle turnings.....	19.00 to 19.50
Short shoveling turnings.....	18.50 to 19.00
Cast iron borings.....	19.00 to 19.50
Heavy breakable cast.....	21.00 to 21.50
Stove plate.....	17.50 to 18.00
Sheet bar crop ends.....	24.00 to 24.50
No. 1 railroad wrought.....	20.50 to 21.00

**Coke and Coal.**—Prices have grown appreciably easier since a week ago in face of the fact that there has been no material betterment in the car supply situation. Eastern demands for coke and soft coal to take the

place of anthracite have virtually ceased and, with production ample for other demands, prices could not stay up. With the passing of winter and a more nearly normal supply of cars, still lower prices are ahead. This week the spot market on Connellsville beehive oven coke is quotable from \$7.50 to \$7.75 for standard furnace grade and from \$8.50 to \$9.25 for standard 72-hr. fuel. Steam coal is quotable from \$3 to \$3.25 per net ton, f.o.b. mines, for mine run, coking coal from \$3.25 to \$3.50, and gas coal at \$3.50.

## To Appeal Claire Furnace Case to United States Supreme Court

WASHINGTON, Feb. 6.—The Federal Trade Commission is preparing an assignment of errors together with a petition to be filed this week with the District Court of Appeals asking it to grant an appeal to the United States Supreme Court of the Claire Furnace Co. case. The District Court of Appeals recently held that manufacturing was not interstate commerce and that the Commission had no authority to compel the iron and steel industry to submit cost figures to the Commission.

The Claire furnace case involves the same fundamental points as those associated with the Maynard coal case. Both relate to the right of the commission to compel the submission to it of costs of production and other data. In both cases the courts have held that the commission did not have this power and that the production of neither steel nor of coal is interstate commerce and consequently Congress itself does not have the authority to confer this power upon the commission.

The commission was rebuffed again last Thursday when Justice Jennings Bailey of the Supreme Court of the District of Columbia handed down a memorandum opinion striking out an amended answer filed by the commission to the injunction proceedings brought against the commission by the Maynard Coal Co. to enjoin compliance with a request of the commission to furnish information as to cost of mining coal. As he had done previously in the Claire furnace case and as the Court of Appeals of the District of Columbia has done in the latter case, Justice Bailey held that Congress has no power to regulate prices and production costs.

## Detroit Scrap Market

DETROIT, Feb. 6.—With the lower grades of waste material selling for \$21 to \$22 per net ton, and a real scarcity of all grades, dealers in the Detroit district are moving their yard stocks which have been accumulated during the past few months. Automobile cast is much in demand and some few sales have been recorded during the past week at \$29. Melters have been endeavoring to buy the lower grades of pig iron as the present scrap prices on a net ton basis are higher than current pig quotations.

The following prices are on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel.....	\$18.00 to \$19.00
Shoveling steel.....	18.00 to 19.00
No. 1 machinery cast.....	24.00 to 26.00
Cast borings.....	15.00 to 16.00
Automobile cast scrap.....	27.00 to 29.00
Stove plate.....	18.00 to 19.00
Hydraulic compressed.....	17.00 to 18.00
Turnings.....	14.00 to 15.00

Some information on the life of a belt conveyor was recently afforded in the case of the Inland Steel Co.'s coke plant at Indiana Harbor, Ind. Fire recently destroyed the 300-ft. inclined belt conveyor and gallery. The installation was made by the Link Belt Co., Chicago, in 1913, employing a 36-in. belt of 8-ply material. Each belt was installed under a guarantee to handle 1,500,000 tons of coal. In the nine years since then each belt has handled approximately 3,500,000 tons, it appears, and was in fair condition at the time of the fire. The Link Belt Co. is rebuilding the conveyors and the Morava Construction Co. the structural work.

## Chicago

### Production Checked by Fuel Shortage—Price Trend of Finished Lines Upward

CHICAGO, Feb. 6.—New business in steel continues to exceed production with increases in operations barred by fuel shortage. Local mills are turning away more and more tonnage because they cannot meet the delivery requirements, and mills east of here likewise are getting filled up. The trend of prices is upward. The leading pipe mills, including the National Tube Co., have advanced merchant pipe \$4 a ton and line and oil country pipe \$6 a ton. The Inland Steel Co., which is booking business by quarters only, is expected to advance plates, shapes and bars \$2 a ton for second quarter delivery.

While the steel market is exceptionally buoyant, pig iron is rather quiet. Close observers of the market are watching the fuel and labor contingency carefully in anticipating future developments. Labor is increasingly scarce and further wage advances are believed probable. The fuel problem is more perplexing. Pocahontas mine run dropped \$1 a ton at the mines in the past week, and under ordinary conditions this would be regarded as a sure portent of a decline in coke. The situation is complicated, however, by transportation difficulties which are sustaining a scarcity market in consuming centers.

**Pig Iron.**—While a number of large sales have been made during the past week, the market is on the whole quiet and it is evident that only a relatively small proportion of the melters in this territory have bought against their second quarter requirements. A local user has closed for 3000 tons of malleable and 1000 tons of foundry for second quarter delivery, and other orders include 1000 tons of foundry for a Wisconsin farm machinery maker, 1000 tons of foundry for a Chicago melter and 1000 tons of malleable for a northern Illinois plant. The price situation shows no particular change, although it is probable that \$29 base, furnace, could still be done on an attractive tonnage. The Southern furnace, shipping by barge and rail, has advanced its base price to \$28.50, delivered. Among outstanding inquiries is one from a Michigan melter for 1000 tons of foundry for second quarter shipment. A local user has closed for 500 tons of charcoal and there have been a number of other fair sized sales of that commodity. Domestic low phosphorus is available at \$37, delivered, and foreign quotations are higher.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or, when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	\$33.15
Northern coke, No. 1, sil. 2.25 to 2.75	\$30.00 to 30.50
Northern coke, foundry No. 2, sil. 1.75 to 2.25	29.50 to 30.00
Malleable, not over 2.25 sil.	29.50 to 30.00
Basic	29.50 to 30.00
High phosphorus	29.50 to 30.00
Southern No. 2, first quarter	30.01 to 31.01
Southern No. 2, second quarter	28.50 to 31.01
Low phos., sil. 1 to 2 per cent, copper free	37.00
Silvery, sil. 8 per cent.	41.29

**Ferroalloys.**—A number of 100-ton sales of ferromanganese have been made and interest in this alloy is increasing in view of probable advance to \$110, seaboard.

We quote 80 per cent ferromanganese, \$115.06, delivered; 50 per cent ferrosilicon, \$85 to \$87.50, delivered; spiegeleisen, 18 to 22 per cent, \$46.05, delivered.

**Plates.**—The Petroleum Midway Co., San Pedro, Cal., has placed storage tanks involving 6000 tons of plates with the Chicago Bridge & Iron Works. Railroad buying continues to put heavy tonnages on local mill books. Fully 42,000 tons for the cars recently ordered by the Illinois Central will be furnished by Chicago producers. Protections are still out on 20,000 cars, involving 200,000 tons. Steel inquiries for mis-

cellaneous car repairs from the Streeter and Ryan car companies total 10,000 tons. A large Western railroad which proposes to build freight cars in its own shops has placed 8000 tons of sheared plates with a local mill for delivery prior to Sept. 1. The Illinois Steel Co. continues to quote 2.20c., Chicago mill, for delivery at convenience. The Inland Steel Co. expects to open its books for second quarter at 2.40c., or \$2 a ton above its first quarter quotation. Mills east of here are quoting 2.20c. to 2.25c., Pittsburgh. With mills generally unable to keep pace with the demand, the trend of prices is strongly upward.

The mill quotation is 2.20c. to 2.30c., Chicago. Jobbers quote 3.05c. for plates out of stock.

**Wire Products.**—Mills are sold out on poultry netting, leaving an unsatisfied demand of considerable proportions. Specifications from car builders for car nails are heavy, while jobbers and others complain that deliveries do not meet their requirements. With all producers heavily committed, the gap between production and demand is expected to widen still further as spring approaches. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 443.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, \$3.45; No. 9 and heavier bright basic wire, \$3.30 per 100 lb.; common wire nails, \$3.45 per 100 lb.; cement coated nails, \$2.90 per keg.

**Cast Iron Pipe.**—Private buying is heavy and if it continues at the present rate, municipalities which enter the market late may be unable to secure their requirements. Railroad as well as gas companies are placing tonnage. The Illinois Central is inquiring for 1000 tons. The Lynchburg Foundry Co. is reported to be the successful bidder on 5000 tons for Detroit. The National Cast Iron Pipe Co. is low bidder on 685 tons for Kenosha, Wis. Prices are strong and further advances are looked for.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$57.20; 6-in. and above, \$53.20; class A and gas pipe, \$3 extra.

**Rail and Track Supplies.**—Mills are hard pressed to make the rail deliveries desired by the railroads. Specifications are being received again fully 90 per cent of the tonnage contracted for last fall. The mild weather has encouraged the carriers to start track laying work. New business in bolts, spikes and tie plates is fair and specifications are pretty liberal. Light rails are in better demand while sales of rolled steel wheels have been heavy.

Standard Bessemer and open-hearth rails, \$43; light rails, rolled steel, 2.15c., f.o.b. makers' mills. Standard railroad spikes, 3c. mill; track bolts with square nuts, 3.85c. to 4c., mill; iron tie plates, 2.50c.; steel tie plates, 2.45c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.65c. base and track bolts, 4.65c. base.

**Bars.**—Demand for soft steel bars continues to expand while available deliveries become more extended as mills add to their bookings. The railroads, car builders, jobbers, automotive plants, concrete bar dealers, in fact, practically all users, are pressing the mills hard for material. Demand from farm implement makers is steadily increasing with the probability that they will have to be satisfied with second half delivery on a large proportion of the material they are buying. The tendency of prices is upward. The Illinois Steel Co. continues to take business for delivery at convenience at 2.10c., Chicago mill, but the Inland Steel Co. is expected to advance to 2.20c. on second quarter material. Mills east of here are quoting from 2.10c. to 2.25c., Pittsburgh. The growing shortage of soft steel is diverting considerable business to the iron and rail steel bar mills. Bar iron sales are steadily mounting and while some business continues to be taken at 2.35c., Chicago, an increasing tonnage is being booked at higher prices. Rail steel mills are also in an improved position and have benefited particularly from the shortage of mild steel for reinforcing purposes. The Wells Brothers Construction Co. has placed 6000 tons of rail steel concrete bars for the Furniture Market Building, Chicago, with the Inland Steel Co. One producer has raised prices to 2.10c., mill, and a general advance on



rail steel is looked for. Forward bookings are heavier, one mill being sold up through the first half.

Mill prices are: Mild steel bars, 2.10c., Chicago; common bar iron, 2.35c. to 2.50c., Chicago; rail steel, 2c., Chicago mill.

Jobbers quote 2.95c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.65c. to 2.75c. base; hoops, 4.30c.; bands, 3.75c.

**Sheets.**—Users continue to press for material and business which calls for first quarter shipment is being diverted to mills east of here. The local independent has not yet opened its books for second quarter and has made no announcement as to whether its prices will remain the same or will be advanced.

Mill quotations are 3.35c. to 3.50c. for No. 28 black, 2.50c. to 2.75c. for No. 10 blue annealed and 4.35c. to 4.50c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago, 4c. for blue annealed, 4.85c. for black and 5.85c. for galvanized.

**Structural Material.**—Fabricating awards reported here aggregate more than 15,000 tons, not counting 6000 tons of oil tank work. Competition for the larger projects is particularly keen between two of the leading fabricators who are believed to be anxious to build up heavy backlogs for the second half of the year as a protection against a possible decline in building activity. The outstanding pending project is the Stevens Hotel, Chicago, requiring 17,000 tons for which the general contract bids were taken last week. On plain material the Illinois Steel Co. continues to quote 2.20c., Chicago mill, for indefinite delivery, while the Inland Steel Co. is expected to advance \$2 a ton to 2.30c. for second quarter shipment. Mills east of here are quoting 2.15c. to 2.25c., Pittsburgh.

The mill quotation on plain material is 2.20c., Chicago. Jobbers quote 3.05c. for plain material out of warehouse.

**Bolts and Nuts.**—The market is firm and there is some talk of advances. Automobile makers are specifying heavily and the farm implement manufacturers, particularly of plows and wagons, are taking out an increasing amount of material against contracts. Bolt and nut makers are commencing to have difficulty in making deliveries as shipments of raw material from the mills are delayed.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.85c.; machine bolts up to  $\frac{3}{4}$  x 4 in., 50 per cent off; larger sizes, 50 off; carriage bolts up to  $\frac{3}{4}$  x 6 in., 45 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, \$2.75 off; blank nuts, \$2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off.

**Reinforcing Bars.**—An unusually large tonnage of concrete bars was placed during the last few days of January to obtain the benefit of the lower prices in force at that time. Awards reported total 16,460 tons which, added to previous lettings, made the aggregate business of the month the heaviest for any January in history. Effective Feb. 1, Chicago warehouse prices advanced to a minimum of 2.65c., with some important sellers quoting 2.75c. Notwithstanding the heavy tonnage just booked, there still remains a considerable amount of business which has not yet been placed. Awards include:

Russell Miller Milling Co., elevator, Duluth, 1100 tons to Corrugated Bar Co.; Gimbel Bros. department store addition, Milwaukee, 800 tons to Inland Steel Co.; Wisconsin Telephone Co. sub-station, garage, etc., Milwaukee, 800 tons to Concrete Engineering Co.; Market building, Kansas City, Mo., 600 tons to Concrete Steel Co.; U. S. Government Veterans' Hospital, Tupper Lake, N. Y., 550 tons to Concrete Steel Co.; Hotel, Fourth and Wells Street, Milwaukee, 550 tons to Corrugated Bar Co.; Waldorf Boxboard Co. plant, St. Paul, Minn., 400 tons to Kalman Steel Co.; the Milwaukee Electric Railway & Light Co. plant, Milwaukee, Wis., 400 tons to Kalman Steel Co.; Bachelor apartments, Milwaukee, 400 tons to Corrugated Bar Co.; Illinois road work, 350 tons to Concrete Steel Co.; Commodore Hotel, Chicago, 350 tons to Concrete Steel Co.; Doctors' and Dentists' Building, Milwaukee, 350 tons to Corrugated Bar Co.; Marquette Cement Co. warehouse, Davenport, Iowa, 300 tons to Corrugated Bar Co.; Illinois road work, 280 tons to Truscon Steel Co.; Chicago Union Station Co. yard work, Canal Street and Jackson Boulevard, 250 tons to Barton Spiderweb System Co.; Holy Name, Annunciation and Nativity churches in the twin cities, 250 tons to Speers-Jevne Co., St. Paul; Hormel

Packing Co. plant, Austin, Minn., 250 tons to American System of Reinforcing; Miehle Printing Press & Mfg. Co. plant addition, Chicago, 250 tons to Concrete Steel Co.; Hydro-electric Plant, Dayton, Ill., 250 tons to Corrugated Bar Co.; Missouri River bridge, Lexington, Mo., 200 tons to Corrugated Bar Co.; Missouri River bridge, Glasgow, Mo., 200 tons to Corrugated Bar Co.; Strauss Building, Chicago, 200 tons to Corrugated Bar Co.; Bourbon Stock Yards Building, Louisville, Ky., 200 tons to Kalman Steel Co.; hotel building, Butte, Mont., 200 tons to Kalman Steel Co.; Penitentiary Building, Joliet, Ill., 200 tons to Olney J. Dean; apartment hotel, Linwood and Pases, Kansas City, Mo., 150 tons to Corrugated Bar Co.; Walsh Apartment Building, Davenport, Iowa, 150 tons to Corrugated Bar Co.; Linns County, Iowa, road work, 150 tons to Concrete Steel Co.; Fond du Lac County, Wis., road work, 100 tons to Concrete Steel Co.; Sieg warehouse, Davenport, Iowa, 100 tons to Concrete Steel Co.; Hydro-electric Plant, Maquoketa, Iowa, 100 tons to Corrugated Bar Co.; furniture market building, Chicago, 6000 tons, to Inland Steel Co.

#### Pending business includes:

Department store, Milwaukee, Wis., 300 tons; Allen A. Co., Kenosha, Wis., hosiery mill addition, 300 tons; new American Exchange Bank Building, Milwaukee, 300 tons; Silverberg-Lince Building, Des Moines, Iowa, 250 tons; Illinois Central Railroad, material for Fulton, Ky., 200 tons; grand stand, Topeka, Kan., 200 tons; Missouri Pacific Railroad, St. Louis, Mo., 100 tons.

**Steel Castings.**—Baldwin Locomotive Works has let the specialties and miscellaneous castings on 50 Pennsylvania locomotives, amounting to nearly 2800 tons, while the Pennsylvania Railroad itself has let nearly 1700 tons for 42 engines, to be built at Altoona. Little, if any, additional miscellaneous castings business has been placed by car builders. This is due in part to the fact that car building work has been slowed up by lagging deliveries of steel from the mills and hence the castings are not yet needed.

**Old Material.**—While some users still hold aloof from the market, consumer buying is broadening rapidly. A large steel works has purchased 15,000 tons of heavy melting and a steel foundry has closed for 5000 tons of low phosphorus grades, while there has been active buying of cast, malleable and iron mills scrap. Prices are strong with a number of grades higher than a week ago. Available supply still appears to fall short of demand, but heavier offerings of both railroad and country scrap are expected as spring approaches. Railroad lists include the Great Northern, 2000 tons; the Pere Marquette, 1500 tons; the Chicago & Eastern Illinois, 1000 tons; the Chicago Great Western and Chicago & Alton 500 tons each and the Erie a blind offering.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails .....	\$23.50 to \$24.00
Cast iron car wheels .....	27.00 to 27.50
Relaying rails, 56 and 60 lb. ....	26.00 to 27.00
Relaying rails, 65 lb. and heavier ..	32.00 to 35.00
Rolled or forged steel car wheels ..	26.00 to 26.50
Rails for rolling .....	21.00 to 21.50
Steel rails, less than 3 ft. ....	23.50 to 24.00
Heavy melting steel .....	19.75 to 20.00
Frogs, switches and guards cut apart .....	19.75 to 20.00
Shoveling steel .....	19.50 to 19.75
Drop forge flashings .....	15.50 to 16.00
Hydraulic compressed sheets .....	17.00 to 17.50
Axle turnings .....	17.50 to 18.00

Per Net Ton	
Iron angles and splice bars .....	23.50 to 24.00
Steel angle bars .....	20.00 to 20.50
Iron arch bars and transoms .....	24.00 to 24.50
Iron car axles .....	26.50 to 27.00
Steel car axles .....	21.50 to 22.00
No. 1 busheling .....	16.25 to 16.75
No. 2 busheling .....	11.50 to 12.00
Cut forge .....	17.50 to 18.00
Pipe and flues .....	14.00 to 14.50
No. 1 railroad wrought .....	18.00 to 18.50
No. 2 railroad wrought .....	17.50 to 18.00
Steel knuckles and couplers .....	23.00 to 23.50
Coil springs .....	24.00 to 24.50
No. 1 machinery cast .....	23.00 to 23.50
No. 1 railroad cast .....	22.00 to 22.50
No. 1 agricultural cast .....	22.00 to 22.50
Pow phos. punchings .....	19.50 to 20.00
Locomotive tires, smooth .....	20.50 to 21.00
Machine shop turnings .....	13.00 to 13.50
Cast borings .....	14.25 to 14.75
Short shoveling turnings .....	14.25 to 14.75
Stove plate .....	19.50 to 20.00
Grate bars .....	19.50 to 20.00
Brake shoes .....	19.50 to 20.00
Railroad malleable .....	23.50 to 24.00
Agricultural malleable .....	23.50 to 24.00

## New York

### German Pig Iron Sold, but Doubt Expressed as to Delivery

NEW YORK, Feb. 6.—Although it has seemed probable that the movement of foreign pig iron to this country was nearly ended, for a time at least, sales of 1650 tons of German iron, analyzing about 2½ per cent silicon and 0.50 to 1 per cent phosphorus, were quickly made a few days ago on a basis of about \$28, Atlantic seaboard. This iron was sold to brokers by an importer with delivery not guaranteed. Owing to present conditions in Germany and France, doubt is expressed whether delivery will be effected. While the price of Scotch iron, foundry analysis, is too high to permit of importation, it is still possible to bring in British iron low in phosphorus at about \$26.75 per ton, c.i.f. port, duty paid. In domestic iron, the demand is light, but prices are well maintained. For immediate delivery, \$28 seems to be the prevailing price in Buffalo for first quarter and \$27 cannot be done so easily for second quarter, while on eastern Pennsylvania, \$28 for No. 2 plain continues to be the quotation for the first half. Buyers seem to be in a waiting attitude, hoping for lower prices. Witherbee, Sherman & Co. will blow in their old No. 1 furnace on or before next Saturday, Feb. 10. The railroad conditions are still extremely embarrassing to shippers and long delays are reported.

We quote delivered in the New York district as follows, having added to furnace prices \$2.27 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25.....	\$32.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75.....	31.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25.....	30.27
Buffalo, sil. 1.75 to 2.25.....	31.91
No. 2X Virginia, sil. 2.25 to 2.75.....	33.44
No. 2 Virginia, sil. 1.75 to 2.25.....	32.44

**Ferroalloys.**—Sales of ferromanganese have been confined to carload and small lots, and the total for the week has aggregated 1500 to 2000 tons, one lot amounting to over 500 tons. One seller refused to quote on 1000 tons for third quarter delivery. All the business has been done at the prevailing quotation of \$107.50, seaboard or furnace. Most of the sales have been British alloy. The spiegeleisen market is very quiet, moderate sales of carload and small lots being reported. There is a fairly good demand for 50 per cent ferrosilicon which is obtainable at \$82.50 to \$87.50, delivered. Quotations are as follows:

Ferromanganese, domestic, furnace, per ton .....	\$107.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port.....	\$107.50
Spiegeleisen, 17 to 19 per cent, furnace, \$35.00 to \$37.00	
Spiegeleisen, 20 per cent, furnace or duty paid .....	\$34.00 to \$36.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads.....	\$82.50 to \$87.50
Ferrotungsten, per lb. of contained metal, 90c. to 95c.	
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered .....	12c. to 14c.
Ferrovandium, per lb. of contained vanadium .....	\$3.50 to \$4.00
Ferrocobalt, 15 to 18 per cent, in carloads, per net ton.....	\$200.00
<b>Ores</b>	
Manganese ore, foreign, per unit, c.i.f., 29c. to 30c.	
Tungsten ore, per unit, in 60 per cent concentrates, nominal .....	\$7.50 to \$8.50
Chrome ore, basic 48 per cent Cr <sub>2</sub> O <sub>3</sub> , crude, per ton, c.i.f. Atlantic seaboard.....	\$18.00 to \$28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS <sub>3</sub> , New York.....	60c. to 70c.

**High-Speed Steel.**—The market is fairly active and prices firm at 75c. to 80c. per lb. for 18 per cent tungsten high-speed steel, with special brands of some companies ranging up to 90c. per lb.

**Cast-Iron Pipe.**—Business continues good with prices strong. There is an active demand from private sources and a fair number of municipal tenders. The low bidder on the 3000 tons of 6-in. and 12-in. water pipe for the Department of Water Supply, Rochester, N. Y., was the Warren Foundry & Pipe Co. We quote per net ton,

f.o.b. New York, in carload lots, as follows: 6-in. and larger, \$56.50; 4-in. and 5-in., \$61; 3-in., \$66.80, with \$4 additional for Class A and gas pipe. Soil pipe makers are in most cases quoting on a higher basis, having increased quotations Feb. 3 by \$5 per ton. The demand is heavy and it is pointed out that materials are higher and labor is increasingly difficult to obtain. While jobbers are beginning to increase their stocks, heavier demand from the consumers in a few weeks is expected to prove a drain on these stocks, resulting in continued demand. We quote discounts of both Southern and Northern makers, delivered New York, as follows: 2 to 6-in. standard, 18 to 20½ per cent off list; heavy, 33 to 35½ per cent off list.

**Warehouse Business.**—There is an active demand for practically all lines. Some warehouses report good business in bars. The recent increase in prices in this district has evidently not had any effect on demand. Sheets show no strong upward tendency, but prices on both black and galvanized are reported slightly firmer. Some warehouses attribute much of the present demand to the fact that mills are well booked with orders and to the railroad situation. Steel pipe has been advanced about \$5 per ton on sizes less than 12 in. and about \$6 per ton on the larger sizes. Business is active in this market. Brass and copper warehouses report an advance of ¼c. per lb. on most brass and copper products. Prices on non-ferrous metals are generally moving upward. Cold-rolled shafting and screw stock is now generally quoted, out of stock, at 4.05c. per lb. for rounds and 4.55c. per lb. for squares, flats and hexagons. We quote prices on page 466.

**Finished Iron and Steel.**—One large independent has advanced prices of plates, shapes and bars to 2.25c., Pittsburgh, and this is its absolute minimum. Other steel companies are trailing along, having stiffened their prices to some extent. The minimum on structural shapes is 2.10c., Pittsburgh, but apparently this price is available only on large tonnages, some mills quoting 2.15c. and 2.20c. On plates 2.15c. seems to be bottom today with 2.20c. and 2.25c. quoted by some mills. Bars are in much the same position, quotations ranging from 2.15c. to 2.25c. It appears to be only a matter of days before the 2.10c. and possibly also 2.15c. quotations will have disappeared. Sellers and also many buyers confidently believe that the market for the heavy commodities is pointing to 2.25c. as a minimum. Large buyers, such as the car companies, are using 2.10c. and 2.15c. in their estimating and then only when given protection by the mills for a reasonable period. The advance in prices of pipe is more fully commented upon in our Pittsburgh report. Other prices are the same as a week ago, but there are indications of strength in sheets and tin plate, with prospects of higher levels. Except in structural steel buildings and oil tank work, there are no extraordinary tonnages called for, but there is a steady demand for ordinary-size lots and mills are declining to quote on a good deal of the business that is put up to them unless the inquiry comes from regular customers. Two oil companies are in the market for a total of 29,000 tons for tanks. A considerable volume of building work is being figured on, and apparently the advancing steel prices are accelerating rather than halting the preparations for spring construction. The demand for concrete reinforcing bars is likewise active. The Concrete Steel Co. was awarded last week two jobs in Philadelphia for the Victor Talking Machine Co. and the Philadelphia Electric Co., totaling 2000 tons. A building at Amsterdam, N. Y., for the Mohawk Carpet Co. requires 700 tons. Even on concrete bars the market is closer to 2.15c. than to 2.10c. Bar iron is moving up and nearly all companies now quote 2.10c. to 2.15c., Pittsburgh, on carload lots and 2.25c. on less than carloads.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, plates and structural shapes, 2.44c. to 2.59c.; bar iron, 2.44c. to 2.49c.

**Coal and Coke.**—Standard Connellsville foundry coke is quoted at \$8.75 to \$9.25 and furnace at \$8.25 to \$8.50. Deliveries are very slow, owing to the poor service of the railroads.



**Old Material.**—The market is strong, but prices are generally unchanged. Heavy melting steel is quotable at \$16 to \$16.50 per ton, with railroad quality at \$16.75 to \$17.25. While most mills in eastern Pennsylvania are in the market for heavy melting steel, sellers are inclined to hold out for higher prices than those offered. For shipment to Pencoyd, \$20 to \$21 per ton is being paid on No. 1 grade and \$21.25 is being paid by one broker for a midland mill on strictly No. 1 heavy melting steel. The market on stove plate is from \$15 to \$16 per ton, based on \$18 paid for shipment to eastern Pennsylvania and about \$18.50 for Mahwah, N. J. Specification pipe is strong at about \$18.50 per ton, Lebanon. Mixed borings and turnings may be quoted at \$14.25 to \$14.75 per ton, based on \$17.50 per ton paid for Bethlehem and \$18 for Monessen. For clean cast borings, \$17.50 per ton Pencoyd is being paid.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard.....	\$16.00 to \$16.50
Steel rails, short lengths, or equivalent .....	16.75 to 17.25
Rails for rolling.....	18.00 to 18.50
Relaying rails, nominal.....	26.00 to 27.00
Steel car axles.....	19.50 to 20.00
Iron car axles.....	26.00 to 27.00
No. 1 railroad wrought.....	18.00 to 18.50
Wrought iron track.....	16.25 to 16.75
Forge fire .....	13.00 to 14.00
No. 1 yard wrought, long.....	17.00 to 17.50
Cast borings (clean).....	14.25 to 14.75
Machine-shop turnings.....	14.25 to 14.75
Mixed borings and turnings.....	14.25 to 14.75
Iron and steel pipe (1 in. diam., not under 2 ft. long).....	14.25 to 14.75
Stove plate .....	15.00 to 16.00
Locomotive grate bars.....	15.00 to 15.50
Malleable cast (railroad).....	16.00 to 16.50
Cast-iron car wheels.....	18.50 to 19.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast.....	\$22.00 to \$23.00
No. 1 heavy cast (columns, building materials, etc.), cupola size .....	19.00 to 20.00
No. 1 heavy cast, not cupola size .....	17.00 to 18.00
No. 2 cast (radiators, cast boilers, etc.) .....	17.50 to 18.50

## Birmingham

### Higher Prices Paid on Some Pig Iron Ton-nages—Production Heavy

BIRMINGHAM, ALA., Feb. 6.—It seemed to be a \$25 pig iron market at the close of the week in Birmingham although sales had been made also at \$24 when large lots and desirable business was offered one maker. The remainder apparently did not go below \$25. One operator booked an average of 1500 tons for five days and 3500 tons Saturday on a one-furnace make. An additional stack coming later will help care for the tonnage. Lots ranged from 200 to 1000 tons and sales were made into Ohio, St. Louis, Chicago and Indiana territory as well as over the South. The largest foundry maker made additional large bookings of rail and river iron for Chicago. Some small lots have brought more than \$25. January bookings were more than make. January production rate was greatest in more than two years and Oxmoor furnace of the Tennessee company and an Alabama Co. furnace are shortly to add to production. Most of the iron going recently at \$24 was booked on quotations made prior to the advance to \$25. The \$25 base will probably be minimum for any tonnage or delivery from now on. Pipe shops will be forced to buy tremendous tonnages to meet the maximum operations which they are assured. The Shelby Iron Co. will blow in its idle charcoal iron stack at Shelby this or next week, the furnace having been repaired.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25.....	\$24.50 to \$25.00
Basic .....	23.50 to 24.00
Charcoal, warm blast.....	32.00 to 33.00

**Cast Iron Pipe.**—The United States Cast Iron Pipe & Foundry Co. is loading up rapidly on the base of \$45, which has been extended to larger as well as smaller sizes. Pasadena has specified De Lavaud pipe on a large order. Sanitary pipe shops are booking considerable new business at \$65 for standard, \$60 for extra heavy and \$70 for fittings.

**Coal and Coke.**—Coke production is almost at capacity with demand in keeping and spot coke ranging from \$8 to \$9. Chicago continues to take 20 cars of Sloss-Sheffield by-product coke per day.

**Old Material.**—The scrap market is lively as to cast and a heavy tonnage is moving. Dealers are not over fond of steel scrap because one large consumer dictates the base and freight rates inhibit going far afield.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails .....	\$16.00 to \$17.00
No. 1 steel.....	14.00 to 16.00
No. 1 cast.....	18.00 to 20.00
Car wheels .....	18.00 to 20.00
Tramcar wheels .....	17.00 to 19.00
Stove plate .....	16.00 to 17.00
Cast-iron borings .....	9.00 to 10.00
Machine shop turnings.....	9.00 to 10.00

## Boston

### Foreign Irons Selling More Freely Because of Transportation Situation

BOSTON, Feb. 6.—Foreign irons are more active in New England because of internal and external railroad embargoes against domestic iron shipments. Local interests are served notice no more Continental iron will be exported. Scotch and English are \$1.50 to \$2 a ton higher at furnaces. At the present rate of buying, foreign iron held by Boston houses will clean up in less than two months. French and Continental iron, silicon 2.50 plus, offered a short time back at \$25 to \$26, sold here the past week at \$28 to \$30 on dock, duty paid. Scotch sold at \$30 and \$31 on dock here and at Bridgeport, duty paid. Little English is available. Domestic iron is less active, with the undertone of prices firmer. Sales for the week included small lots of Buffalo at \$27.50 and \$28, eastern Pennsylvania at \$29, Virginia at \$27 and Alabama at \$25 furnace base, and 500 tons high manganese and car lots for correcting mixtures at prices somewhat out of line with those on regular foundry grades, the buyer having an advantage. It is now said a machinery maker last week bought 1500 tons Virginia, 2500 tons Pittsburgh, and 1500 tons eastern Pennsylvania No. 2X and No. 1X, first and second quarter delivery.

We quote delivered prices on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices \$3.65 freight from eastern Pennsylvania, \$4.91 from Buffalo, \$5.92 from Virginia and \$9.60 from Alabama:

Eastern Penn., sil. 2.25 to 2.75.....	\$32.15 to \$34.65
Eastern Penn., sil. 1.75 to 2.25.....	31.65 to 33.65
Buffalo, sil. 2.25 to 2.75.....	32.91 to 33.91
Buffalo, sil. 1.75 to 2.25.....	32.41 to 32.91
Virginia, sil. 2.25 to 2.75.....	33.42 to 34.42
Virginia, sil. 1.75 to 2.25.....	32.92 to 33.92
Alabama, sil. 2.25 to 2.75.....	34.10 to 35.10
Alabama, sil. 1.75 to 2.25.....	33.60 to 34.60

**Iron Importations.**—During the week ended Feb. 3, 1200 tons of Scotch iron was received at this port, whereas in the previous week importations amounted to but 100 tons. January importations aggregated 23,121 tons, made up as follows: Belgium, 5553 tons; Scotch, 5925 tons; German, 5671 tons; English, 5972 tons. A small proportion of Scotch iron received here was diverted to Providence, R. I., as well as 4000 tons of Belgian not included in the foregoing figures. In the week 500 tons of ferromanganese was received at Boston. The congestion of iron at Boston is less acute, shipments from here and from Providence, R. I., the past ten days aggregating very nearly 10,000 tons. While the inability of the railroads to furnish cars was a primary factor in the pig iron congestion, the heavy snows making it impossible for the removal of merchandise in general from Boston wharves, together with exceptionally heavy importations of foreign wool added greatly to complications. Thousands upon thousands of tons of general merchandise were removed from wharves the past week, which should make for a free movement of pig iron unless additional heavy snows are experienced.

**Warehouse Business.**—Cold-rolled steel has been advanced \$3 a ton. Iron and steel prices otherwise re-

main as heretofore. Mills, especially those maintaining warehouses in this district, are making freer shipments of bars, shapes and sheets. Bolts and nuts also are coming forward more freely from mills. Sheet lead is up  $\frac{1}{4}$ c. a pound to  $14\frac{1}{4}$ c. per lb. base, list.

Jobbers quote: Soft steel bars, \$3.21 $\frac{1}{2}$  per 100 lb. base; flats, \$4; concrete bars, \$3.36 $\frac{1}{2}$ ; structural steel, \$3.21 $\frac{1}{2}$  to \$3.65; tire steel, \$4.65 to \$5; open-hearth spring steel, \$5 to \$6.50; crucible spring steel, \$12; steel bands, \$4.40; hoop steel, \$4.90; cold rolled steel, \$4.15 to \$4.65; refined iron, \$3.21 $\frac{1}{2}$ ; best refined, \$4.50; Wayne iron, \$5.50; Norway iron, \$6.60 to \$7.10; plates, \$3.31 $\frac{1}{2}$  to \$3.53 $\frac{1}{2}$ ; No. 10 blue annealed sheets, \$4.21 $\frac{1}{2}$  per 100 lb. base; No. 28 black sheets, \$5.40; No. 28 galvanized sheets, \$6.40.

**Coke.**—The New England Coal & Coke Co. February contract price on by-product foundry coke is unchanged at \$16 delivered within the \$3.10 freight zone, and the Providence Gas Co., \$15. Both companies are doing a little better in the matter of deliveries due to a larger car supply, yet are far behind on contract specifications. Connellsville cokes are less active because of the red tape necessary to get shipments through.

**Old Material.**—Renewed inquiries and further advances in prices for certain materials are the outstanding features of the market. Forged scrap and bundled skeleton are 25c., wrought pipe, railroad malleable and chemical borings 50c., and machine shop turnings and rails for rerolling \$1 a ton higher. Heavy melting steel is unsettled, higher prices occasionally being reported by dealers, and lower by others. Average steel prices show no change, however. New England foundries are paying \$1 more for machinery cast, loom cast compelling a premium of at least 50c. over common material. Scrap demands include practically all materials. Business in this territory is still hampered by a lack of material and backwardness of railroads in placing cars.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$23.50 to \$24.00
No. 2 machinery cast.....	21.50 to 22.00
Stove plate .....	16.50 to 17.00
Railroad malleable .....	22.00 to 23.00
Bundled sheets .....	14.00 to 14.50
Car wheels .....	20.00 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$16.00 to \$16.50
No. 1 railroad wrought.....	17.00 to 17.50
No. 1 yard wrought.....	15.00 to 15.50
Wrought pipe (1 in. in diam., over 2 ft. long).....	13.60 to 14.10
Machine shop turnings, regular..	12.50 to 13.50
Cast iron borings, rolling mill....	13.50 to 14.00
Cast iron borings, chemical.....	17.50 to 18.00
Blast furnace borings and turnings .....	12.00 to 12.50
Forged scrap and bundled skeleton	14.00 to 14.25
Axles .....	20.00 to 20.50
Shafting .....	20.00 to 21.00
Rails for rolling.....	17.00 to 17.50

## Buffalo

### Finished Material Prices Advance—Pig Iron Buying Light

**BUFFALO, Feb. 5.**—Inquiry for pig iron is quiet and sales slow. Sellers generally feel that higher prices are close at hand but concessions have been made on quotations for delivery to New England points. The \$28 base seems to be the figure for first quarter. A quotation of \$28.50 on a 500-ton inquiry did not bring the business. The 500-ton lot is the largest inquiry of the week in one office. Another sold a 1000-ton lot and two 500-ton lots. The 50c. differential is in effect, although every effort is made to get \$1. Malleable is quoted at \$28.50 and \$29. Generally the volume is healthy but is made up of a great number of small tonnages. Improvement in the car situation the latter days of the week is noticed. On second quarter business, the base quotation is \$28 and \$1 differential.

We quote f.o.b. per gross ton Buffalo as follows, the higher price being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil....	\$29.00 to \$30.00
No. 2X foundry, 2.25 to 2.75 sil....	28.00 to 28.50
No. 2 plain, 1.75 to 2.25 sil.....	27.00 to 28.00
Basic .....	27.00 to 28.00
Malleable .....	28.00 to 29.00
Lake Superior charcoal.....	33.28

**Finished Iron and Steel.**—Bar prices have been stepped up and 2.15c. appears to be the lowest price in several offices, while 2.10c. is still in force at one office. The leading local interest has filled its books for first quarter except for occasional tonnages and no second quarter selling has been started. Quotations of 2.25c. have been put out. Canadian plate demand is brisk. Mills and their agencies are not touching small lots of bars, thus throwing this business to warehouses. A steel car maker is inquiring for 8800 tons of bars and plates for second quarter delivery and 150 tons of plates for immediate shipment. Warehouse business is brisk and prices have been advanced.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.35c.; plates, 3.35c.; soft steel bars, 3.25c.; hoops, 4.35c.; bands, 4.05c.; blue annealed sheets, No. 10 gage, 4.05c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 4.10c.

**Old Material.**—The market is strong but buying has quieted. Railroad lists closed last week brought high prices but very little material came to Buffalo. Dealers are active between themselves. Prices are stronger.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel.....	\$21.00 to \$21.50
Low phos., 0.04 and under.....	24.25 to 25.00
No. 1 railroad wrought.....	20.00 to 20.50
Car wheels .....	22.00 to 23.00
Machine-shop turnings .....	15.50 to 16.00
Cast iron borings.....	17.50 to 18.00
Heavy axle turnings.....	20.00 to 20.50
Grate bars .....	19.50 to 20.00
No. 1 bushing.....	19.25 to 19.75
Stove plate .....	19.00 to 19.50
Bundled sheet stampings.....	15.50 to 16.00
No. 1 machinery cast.....	23.50 to 24.50
Hydraulic compressed .....	19.50 to 20.00
Railroad malleable .....	23.00 to 23.50

## Cincinnati

### Pig Iron Prices Show Hardening Tendency—Scrap Advances

**CINCINNATI, Feb. 6.**—A fair tonnage of iron was sold in the Cincinnati district during the past week in lots ranging from carloads to 300 tons, with one sale reported of 1000 tons. An Indiana melter bought 1000 tons of resale Southern iron at \$24, Birmingham base, and a central Ohio melter took 500 tons of Northern malleable on the basis of \$27.50, Iron-ton. Prices generally rule the same as the week before, though a hardening tendency is noted. On Southern iron, practically all furnaces are now on a \$25 base for second quarter, but at least two are naming \$24 for first quarter. Two furnaces in the Iron-ton district raised their price 50c. a ton, but one still is quoting \$27.50, and booking a fair number of orders. It is probable that this price will be withdrawn this week. Inquiry is light, a Kentucky melter being in the market for 600 tons and several others for 200 to 300 being figured on.

Based on freight rates of \$4.05 from Birmingham and \$2.27 from Iron-ton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)....	\$28.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	28.55
Ohio silvery, 8 per cent.....	38.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	29.77
Basic Northern .....	29.27
Malleable .....	29.77

**Finished Material.**—The demand for bars and shapes continues steadily, although there was a slight letup noticed since the first of the month. The demand for plates, however, is exceptionally heavy, and tank manufacturers are finding it almost an impossibility to secure enough steel for the work in hand. Some tank manufacturers have already taken in all steel due on first quarter contracts, and are putting forth strenuous efforts to secure additional tonnages. Mills generally are out of the market for first quarter delivery, and while some have booked tonnage for April shipment, have not opened for full second quarter. On bars and shapes, 2.15c. has been done, with 2.25c. getting more general as the asking price. Plates apparently cannot be had for any delivery under 2.25c. There was a lull in buying in wire products, some mills having withdrawn from the market entirely on plain wire and wire rods, and only being willing to quote mixed carloads of fence and wire nails. Sheets are in good demand.



and a fairly sizable order for galvanized sheets has not found a taker. Prices are strong, particularly on blue annealed and automobile body sheets. On blue annealed 2.75 has been done and it is reported that premiums have been offered above the regular 5c. price for automobile body sheets. The demand for reinforcing bars is showing much life, and a number of projects have been placed where the tonnage is under 100 tons. For the new plant of the H. C. Godman Shoe Co., Columbus, Ohio, 750 tons is reported placed with a Cleveland district producer. The Concrete Steel Co. has taken 200 tons for a factory building at Cincinnati. On reinforcing bars, 2.15c., Pittsburgh base, is now apparently the minimum quotation, with some mills quoting 2.25c. A number of small projects are up for bids in the structural field, including an office building for the United Travellers at Columbus, Ohio, tonnage unstated, and two high school buildings at Piqua, Ohio, with a combined tonnage of approximately 400 tons. The only award reported was a building for the Indianapolis Light & Power Co., 350 tons, to the Central States Bridge Co.

**Tool Steel.**—Orders are more plentiful and of larger size, following improvement in manufacturing conditions, and since the first of the month several fair-sized orders for immediate shipment have been received from machine tool manufacturers. Prices are strong at 75c. per lb. for 18 per cent tungsten high speed steel, with special brands of some companies running up to \$1 per lb.

**Warehouse Business.**—Local jobbers report a big demand for materials for quick shipment, and indications are that this condition will continue for some time, owing to the sold-up condition of mills. Prices are very firm, and it is expected that sheets and wire products will be advanced \$3 per ton following advances recently made by mills.

Cincinnati jobbers quote: Iron and steel bars, 3.10c. base; reinforcing bars, 3.20c. base; hoops, lighter than No. 12, 4.30c.; bands, 3.85c. base; shapes, 3.20c. base; plates, 1/4-in. and heavier 3.20c., lighter 3.35c.; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, \$3.10 per 100 lb.; common wire nails, \$3.20 per keg, base.

**Coke.**—Foundry coke is in fair demand, but furnace coke is quiet. The domestic market has been pretty well satisfied. Prices are inclined to softness, but are being fairly well maintained. Connellsville furnace coke is quoted at \$7.75 to \$8, and foundry at \$9 to \$9.50. New River and Wise County foundry coke is unchanged at \$12 and \$9 respectively. We note a sale of a fairly heavy tonnage of Southern by-product foundry fuel to the Chicago district on the basis of \$8.50, Birmingham.

**Old Material.**—The local scrap market is inactive, but demand from Cleveland and Youngstown districts is reflected in higher prices being paid by dealers for materials. Local dealers report a scarcity of scrap and feel that much higher prices will prevail in the near future.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	\$13.50 to \$14.00
Iron rails	17.50 to 18.00
Relaying rails, 50 lb. and up	26.50 to 27.50
Rails for rolling	18.50 to 19.00
Heavy melting steel	18.50 to 19.00
Steel rails for melting	16.50 to 17.00
Car wheels	20.50 to 21.00

Per Net Ton	
No. 1 railroad wrought	15.50 to 16.00
Cast borings	12.50 to 13.00
Steel turnings	12.00 to 12.50
Railroad cast	18.00 to 18.50
No. 1 machinery cast	21.00 to 21.50
Burnt scrap	12.00 to 12.50
Iron axes	22.00 to 22.50
Locomotive tires (smooth inside)	15.50 to 16.00
Pipes and flues	12.50 to 13.00

A civil service examination for associate civil engineer for structural work in the Navy Yard, Mare Island, Cal., has been announced by the United States Civil Service Commission, Washington, to which application should be made before March 27.

## Cleveland

### Some Activity in Pig Iron, but Second Quarter Buying Not Overlooked

CLEVELAND, Feb. 6.—A limited demand has developed for small lots of ore needed by consumers to fill in before the opening of navigation. Two lots of re-sale ore were disposed of during the week, one of 1000 tons of Bessemer, and the other of 5000 tons of silicious ore. Both sales were made at last season's prices. Cre shipments from Lake Erie docks have increased, the movement during January being 767,568 tons as compared with 685,778 tons during December and with 211,533 tons during January of last year. The dock balance Feb. 1, was 8,466,972 tons, as compared with 8,223,216 tons on Feb. 1 last year. For prices see page 444.

**Pig Iron.**—Some activity in foundry iron for the second quarter developed in this city during the week, one seller booking orders for about 8000 tons. The local market has been quiet for some time, although a fair volume of buying for the second quarter had developed in other sections. Orders from Cleveland consumers included 3000 tons, 2000 tons and 900 tons from three foundries in the automobile field and 1500 tons from a jobbing foundry. Another lake furnace sold several thousand tons of foundry and malleable iron including two 1000-ton lots for the first quarter, largely to automotive and agricultural implement interests, its minimum price being \$28. However, a general buying movement has not yet developed for the second quarter and many consumers show no disposition to place orders at present. While some consumers think that prices may react if fuel costs decline, producers look for higher priced ore and possibly higher cost which they say would offset any saving in fuel costs. A local producer late during the week made a 50c. advance on foundry and malleable iron to \$28 and on Monday made a further 50c. advance on the same grades, the last advance being for Cleveland delivery only. One lake furnace made a few small lot early shipment sales at \$29 and \$29.50. Southern iron is still quoted at \$25 by most producers and it is claimed that most of the \$24 iron that is being offered is re-sale iron in the hands of brokers. We note the sale of 2000 tons of low phosphorus iron, including three 500-ton lots for delivery through April. Some \$30 quotations on standard low phosphorus iron have been made by a Tennessee company. The United Alloy Steel Corporation, Canton, is inquiring for 5000 tons of basic iron.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron includes a 50c. switching charge. Ohio silvery and Southern iron prices are based on a \$3.02 freight rate from Jackson and a \$6 rate from Birmingham.

Basic, Valley furnace	\$26.75 to \$27.00
Northern No. 2 fdy., sil. 1.75 to 2.25	28.50 to 29.00
Southern fdy., sil. 1.75 to 2.25	30.00 to 31.00
Malleable	28.50 to 29.00
Ohio silvery, 8 per cent	39.52
Standard low phos., Valley furnace	35.00

**Bolts, Nuts and Rivets.**—Specifications against bolt and nut contracts are heavy and some consumers are placing orders for additional lots, and others are inquiring for second quarter contracts, but makers are not taking orders for that delivery. It is claimed that the market is firmer, and that the extreme discount of 60 and 10 per cent for large machine bolts for immediate shipment has disappeared. However, the quoted discounts apply only for small orders, round lot business being placed at the September prices, or 10 per cent lower than quoted discounts. The leading local manufacturer is now holding to regular quotations on rivets and small lot sales are being made at these prices.

**Sheets.**—The market is very firm and the price tendency is upward, although black sheets can still be bought at 3.35c. Several mills are filled and have withdrawn from the market. A local firm has advanced prices on carload lot orders for mill shipment to 3.60c. for black, 2.90c. for blue annealed, and 4.60c. for galvanized.

**Warehouse Business.**—Jobbers have advanced prices \$3 a ton on cold-rolled steel, following the recent mill advance. Other prices are unchanged.

Jobbers quote steel bars, 3.06c.; plates and structural shapes, 3.16c.; No. 9 galvanized wire, 3.30c.; No. 9 annealed wire, 2.80c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; No. 10 blue annealed sheets, 3.65c. to 3.76c.; cold-rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and No. 20 gage or heavier, 3.84c.; narrower than 1 in. or lighter than No. 20 gage, 4.36c.

**Reinforcing Bars.**—With the demand not heavy for early shipment, rail steel reinforcing bars do not show the strength of soft steel bars and are quoted at 2c. to 2.10c.

**Semi-Finished Steel.**—Considerable inquiry is coming out for sheet bars for both immediate delivery and March shipment. Some consumers are apparently unable to secure their requirements from their usual sources of supply. A local producer is sold up for the first quarter and has not opened its books for the second quarter. The market is firm at \$38.50.

**Finished Iron and Steel.**—There is no falling off in the heavy demand for steel. A number of producers are virtually out of the market. Prices continue to stiffen and with some consumers it now seems to be more of a question of deliveries than price. The heaviest demand is for plates and on these some mills have made sharp price advances. While the 2.10c. price has not disappeared, a number of sales of tank plates in small lots have been made at 2.50c., Pittsburgh, and a Valley consumer placed a 300-ton lot at a price equivalent to 2.515c., Pittsburgh. On steel bars, 2c. might still be done on desirable orders for extended deliveries, but round lot sales are being made at 2.10c. and higher. On structural material 2.10c. is the minimum quotation and some mills are holding to 2.25c. for bars and shapes. New inquiries have come out for 12,000 tons of plates for oil tank work and one consumer has placed tank work requiring 6000 tons and plans to buy the steel and fabricate the remaining 6000 tons. It is understood that the inquiry for one to three lake boats has been withdrawn. Considerable steel bar business is still coming from bolt and nut manufacturers. Two orders from this source during the week were for 7000 tons for deliveries extending through April. In the building field, considerable inquiry is coming out for work requiring lots up to 500 tons. Plans are expected early in the summer for the new Statler Hotel, Detroit, requiring approximately 10,000 tons. Automobile companies in Detroit and immediate territory are now on production schedule of close to 11,000 cars per day, including 5800 a day at the Ford plant. In addition the Ford company is making 400 tractors per day.

**Coke.**—Foundry coke is slightly easier, although quotations on Standard and Connellsville makes are unchanged from \$9 to \$9.50.

**Old Material.**—The market is dull, but very firm. Heavy melting steel has advanced 25c. a ton and several other grades are 50c. a ton higher. Local and Valley district mills have round tonnages of scrap coming on contracts placed at lower than prevailing prices, but some are not getting shipments as fast as needed. There is a good supply of turnings, but ruling prices are not bringing out a great deal of heavy melting steel. One local dealer has purchased a limited tonnage of the latter grade at \$23 for Youngstown.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel.....	\$20.75 to \$21.00
Rails for rolling.....	22.00 to 23.00
Steel rails under 3 ft.....	21.25 to 22.00
Iron rails.....	18.50 to 19.00
Iron car axles.....	25.00 to 26.00
Low phosphorus melting.....	22.00 to 22.50
Cast borings.....	18.00 to 18.50
Machine shop turnings.....	15.75 to 16.00
Mixed borings and short turnings.....	16.75 to 17.25
Compressed steel.....	18.50 to 19.00
Railroad wrought.....	19.00 to 19.50
Railroad malleable.....	22.75 to 23.25
Light bundled sheet stampings.....	16.50 to 17.00
Steel axle turnings.....	18.00 to 18.50
No. 1 cast.....	21.00 to 22.00
No. 1 busheling.....	17.00 to 17.25
Drop forge flashings over 10 in.....	15.50 to 16.00
Drop forge flashings under 10 in.....	16.50 to 16.75
Railroad grate bars.....	18.00 to 18.50
Stove plate.....	18.00 to 18.50
Pipes and flues.....	15.50 to 16.00

## St. Louis

### Pig Iron Buying Confined Largely to Small Tonnages

ST. LOUIS, Feb. 6.—Buying of pig iron during the week was confined largely to smaller tonnages, but the volume was fairly large, although smaller than the previous week. The sales of the Granite City maker amounted to about 2000 tons. Melters are increasing shipping specifications and are insisting on quick shipments, showing a need of iron. The market is strong at \$29 to \$30, Chicago, for Northern iron, and \$25, Birmingham, for Southern. Granite City still quotes \$30.50 to \$31.50 f.o.b. furnace. Inquiries include 2000 tons of foundry for Indianapolis, 500 tons of basic per month during the second quarter and 100 tons of foundry per month during second quarter for two different Iowa melters.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.16 freight from Chicago, \$3.28 from Birmingham (rail and water), \$5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25....	\$31.16 to \$32.16
Northern malleable, sil. 1.75 to 2.25....	31.16 to 32.16
Basic.....	31.16 to 32.16
Southern fdy., sil. 1.75 to 2.25....	30.17

**Finished Iron and Steel.**—Fabricators continue to buy material for stock, and jobbers are showing more interest in purchases, one Eastern mill reporting more business in January than for any similar period for two years. The only railroad inquiry of consequence is that of the Missouri Pacific for 1050 tons of either billet or re-rolled reinforcing bars. The order of the United Railways Co. for 350 tons of flat bars was divided among the Midvale Steel & Ordnance Co., Scullin Steel Co. and Laclede Steel Co. Warehouses have advanced cold drawn rounds, shafting and screw stock 15c. to 4.05c., bars, shapes and plates being advanced 15c. the previous week.

For stock out of warehouse we quote: Soft steel bars, 3.05c. per lb.; iron bars, 3.05c.; structural shapes, 3.15c.; tank plates, 3.15c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 4.05c.; structural rivets, 3.85c. per 100 lb.; boiler rivets, 3.95c.; tank rivets,  $\frac{3}{4}$  in. and smaller, 55 per cent off list; machine bolts, large, 50 per cent; smaller, 50 per cent; carriage bolts, large, 45 per cent; small, 45 per cent; lag screws, 55 per cent; hot pressed nuts, square or hexagon blank, \$2.75; and tapped, \$2.75 off list.

**Old Material.**—Local consumers bought very little old material during the week, but there was a good demand from other centers. Stocks in hands of dealers are low, and the small tonnages that are coming in from the railroads are being quickly absorbed. The market is strong and advancing. A Pennsylvania Railroad list of 400 tons closed last Saturday. Heavier relaying rails are in good demand. The Toledo, St. Louis & Western Railroad has sold to the National Steel Rail Co., St. Louis, approximately 8000 tons of relaying and rerolling rails of 60-lb. to 80-lb. sections which will come out of the main line for delivery at any point on that system. The rails are now being released from tracks and being replaced by heavier sections.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails.....	\$20.00 to \$20.50
Rails for rolling.....	21.00 to 21.50
Steel rails, less than 3 ft.....	22.00 to 22.50
Relaying rails, standard section.....	26.00 to 26.50
Cast iron car wheels.....	26.50 to 27.00
Heavy melting steel.....	19.00 to 19.50
Heavy shoveling steel.....	18.00 to 18.50
Frogs, switches and guards cut apart.....	20.00 to 20.50
Per Net Ton	
Heavy axles and tire turnings.....	12.50 to 13.00
Steel angle bars.....	19.00 to 19.50
Iron car axles.....	28.50 to 29.00
Steel car axles.....	23.00 to 23.50
Wrought iron bars and transoms.....	24.00 to 24.50
No. 1 railroad wrought.....	18.00 to 18.50
No. 2 railroad wrought.....	17.50 to 18.00
Railroad springs.....	24.00 to 24.50
Steel couplers and knuckles.....	24.00 to 24.50
Cast iron borings.....	12.00 to 12.50
No. 1 busheling.....	16.00 to 16.50
No. 1 railroad cast.....	20.50 to 21.00
No. 1 machinery cast.....	22.50 to 23.00
Railroad malleable.....	20.50 to 21.00
Machine shop turnings.....	10.00 to 10.50



## Philadelphia

### Prices of Plates, Shapes and Bars Still Moving Upward

PHILADELPHIA, Feb. 6.—Although a number of transactions in plates and shapes have been concluded within the past several days at 2.10c., Pittsburgh, it is certain that the market has now departed from that level and the minimum is nearer 2.15c., with a number of makers quoting 2.25c., Pittsburgh. Steel bars are firm at 2.15c. and with many transactions now being closed at 2.20c. and 2.25c. Some extreme examples of price advances are noted, as for example one Eastern maker of structural shapes is quoting 2.35c., Pittsburgh, and has taken small orders at this price. Steel companies were freely predicting today that before the end of the week the entire steel trade would be quoting 2.25c. as a minimum on the three heavy commodities. Orders continue to come to the mills at a fairly heavy rate and some of them are declining more tonnage than they are accepting, particularly in shapes and bars. There is still open capacity for plates at Eastern mills, but their owners are now showing no disposition to increase their backlogs at prices which are declared to be unprofitable.

**Pig Iron.**—Current reports have probably exaggerated the volume of recent sales of Nova Scotia basic and foundry iron, which are now said to total 15,000 tons rather than the 20,000 tons mentioned last week. Of this about 12,000 tons was off-grade basic, being high in phosphorus, about 1.60 per cent, and therefore is being mixed by open-hearth furnaces with eastern Pennsylvania standard basic. The remaining 3,000 tons was made up of foundry grades of standard analysis, this iron, it is stated, being made from a mixture of Wabana and Spanish low-phosphorus ores. The prices at which the Nova Scotia foundry iron has been sold were \$2 or \$3 a ton under quotations on similar grades of eastern Pennsylvania iron. Among the buyers have been at least two steel companies, two cast-iron pipe companies and a number of gray-iron foundries. Prices of eastern Pennsylvania foundry iron are about stationary, with \$28, furnace, being quoted by all sellers on No. 2 plain; \$29 for No. 2X and \$30 for No. 1X. On small lots some furnaces have gotten 50c. a ton higher. There is a fair degree of activity in lots ranging from carloads to 500 tons, with one or two sales of 1,000 tons. In basic there is more tonnage in demand, one Eastern independent being in the market for 10,000 tons, but it is reported that a part of its requirements have been covered by the purchase of Nova Scotia iron. Another Eastern steel company bought a few thousand tons of domestic basic last week at about \$28, delivered, and is negotiating for more. Receipts of foreign iron are falling off, last week's arrivals totaling only 2,500 tons, 1,000 from France and 1,500 from England.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to \$1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$28.76 to \$29.14
East. Pa. No. 2X, 2.25 to 2.75 sil.	29.76 to 30.14
East. Pa. No. 1X	30.76 to 31.14
Virginia No. 2 plain, 1.75 to 2.25 sil.	32.17 to 33.17
Virginia No. 2X, 2.25 to 2.75 sil.	33.17 to 34.17
Basic delivered eastern Pa.	28.00 to 28.50
Gray forge	28.00
Malleable	31.14 to 31.26
Standard low phos. (f.o.b. furnace)	35.00
Copper bearing low phos. (f.o.b. furnace)	30.00

#### Foreign Pig Iron

All prices f.o.b. cars Philadelphia, duty paid.	
Scotch foundry, 2.50 to 3 sil.	\$28.75 to \$29.25
English foundry, 1.50 to 2 sil.	28.00 to 28.50
English foundry, 2 to 2.50 sil.	28.50 to 29.00
English foundry, 2.50 to 3 sil.	29.00 to 29.50
Continental foundry, 1.80 to 2.50 sil.	28.00
Continental foundry, 2.50 to 3 sil.	28.50
Low phos., copper free, guar. not over 0.035 per cent phos.	28.50 to 29.50

**Ore.**—Chrome ore receipts at this port last week totaled 1,600 tons, all from Spain.

**Coke.**—The coke market shows further signs of easing off. A sale of spot blast furnace coke was made

a few days ago at \$7.60, Connellsville. Other offers have been made at \$7.75, and the latter is about the top of today's market.

**Semi-Finished Steel.**—The minimum on open-hearth rerolling billets is now \$40, Pittsburgh, and the minimum on forging billets is \$45, but some quotations have been made at \$2.50 a ton higher. An Eastern company which is out of the market on semi-finished steel of specified analysis and sizes is offering its customers 1½ and 4-in. mixed open-hearth and Bessemer billets from a stock pile.

**Plates.**—Two or three Eastern plate mills are now quoting 2.25c., Pittsburgh, as a minimum. The Pennsylvania Railroad last week closed for about 3,500 tons and is reported to have paid not over 2.10c., Pittsburgh, but this price has now practically disappeared and 2.15c. is more nearly today's minimum. This road has sent out an inquiry for 5,000 to 10,000 tons for second quarter and, if prices are favorable, will probably buy the larger amount. An order for 7,500 tons of plates for tanks has come to an Eastern mill.

**Structural Shapes.**—There is a wide range of prices on shapes, the lowest being 2.10c. and the highest 2.35c., Pittsburgh, the latter price having been obtained on several small lots by the mill quoting it. Except on very desirable tonnages it is doubtful if 2.10c. could be done, the prices quoted on the ordinary run of business being from 2.15c. to 2.25c.

**Bars.**—An advance to 2.25c. on steel bars by one large independent interest will probably be followed by others and the present minimum of 2.15c., Pittsburgh, is expected by the mills to disappear shortly. The demand for bars is greater than the immediate supply and several of the leading makers are turning away business. Bar iron mills are quoting 2.10c. and 2.15c., Pittsburgh, and the volume of business is slowly increasing.

**Sheets.**—The market is now firm at 2.75c. for blue annealed, 3.50c. for black and 4.50c. for galvanized. Advances of \$2 a ton on black and \$5 on galvanized by two or three mills in the central territory lead Eastern mills to believe that the whole market is headed toward a higher level of prices.

**Warehouse Business.**—Round cold rolled steel has been advanced 15c. per 100 lb. to \$4 and squares and hexagons the same amount to \$4.50. We quote for delivery in Philadelphia as follows:

Soft steel bars and small shapes, 3.15c.; iron bars (except bands), 3.15c.; round edge iron, 3.35c.; round edge steel, iron finish, 1½ x ½ in., 3.35c.; round edge steel planished, 4c.; tank steel plates, ¼-in. and heavier, 3.25c.; tank steel plates, ½-in., 3.47c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3.15c.; structural shapes, 3.25c.; diamond pattern plates, ¼-in., 4.95c.; ½-in., 5.15c.; spring steel, 4.25c.; round cold-rolled steel, 4c.; squares and hexagons, cold-rolled steel, 4.50c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.25c.; narrower than 1 in., all gages, 4.75c.; steel bands, No. 12 gage to ¾-in., inclusive, 3.95c.; rails, 3c.; tool steel, 8.50c.; Norway iron, 6.50c.

**Old Material.**—The scrap trade points out that incorrect inferences have been drawn by the steel mills from recent reports of a loosening of the New England railroad situation. The embargo on shipments of scrap from New England to eastern Pennsylvania has applied only to shipments originating on the Boston & Maine and Boston & Albany. The New York, New Haven & Hartford has declined to accept shipments from those roads, but has forwarded material originating on its own lines. Estimates of various factors in the scrap trade are that from one-third to two-thirds of the normal volume of scrap has been coming out of New England and that there have been no large accumulations to flood the mills when easier railroad conditions come. The New Haven road lifted its embargo a week or so ago but has put it on again, and the situation is further complicated by car shortage and the tie-up of traffic due to heavy snows in that section. Except on heavy melting steel, which is slightly weaker, there has been no appreciable change in scrap prices. Such changes on other grades as have occurred within the past week are advances. The Pennsylvania Railroad list

went at very high prices and much of the material is to be shipped to the Pittsburgh district, bids submitted by mills and brokers in the East having been invariably too low. There are various opinions as to the course of the market, some holding that there is a temporary reaction, which will be followed by another movement upward, while others believe that the top of the market has been reached.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel.....	\$20.00 to \$21.00
Scrap rails .....	20.00 to 21.00
Steel rails for rolling .....	22.00 to 23.00
No. 1 low phos., heavy 0.04 and under .....	25.00 to 26.00
Cast iron car wheels .....	24.00 to 25.00
No. 1 railroad wrought.....	24.00 to 25.00
No. 1 yard wrought.....	20.00 to 21.00
No. 1 forge fire .....	18.50 to 19.00
Bundle sheets (for steel works) ..	18.00 to 18.50
No. 1 busheling .....	19.00 to 20.00
Mixed borings and turnings for blast furnace use .....	17.50 to 18.00
Machine shop turnings (for steel works use) .....	18.50 to 19.00
Machine shop turnings (for rolling mill use) .....	18.50 to 19.50
Heavy axle turnings (or equivalent) .....	20.00 to 20.50
Cast borings (for steel works and rolling mills) .....	17.50 to 18.50
Cast borings (for chemical plants) ..	22.50 to 25.00
No. 1 cast .....	24.00 to 25.00
Heavy breakable cast (for steel plants) .....	22.00 to 22.50
Railroad grate bars.....	19.50 to 20.00
Stove plate (for steel plant use) ..	19.00 to 19.50
Railroad malleable .....	19.00 to 19.50
Wrought iron and soft steel pipes and tubes (new specifications) ..	19.00 to 19.50
Shafting .....	24.00 to 25.00
Steel axles .....	24.00 to 25.00

## JUDGE GARY SAILS

### He Says Much Depends Upon Having Sense Enough to Enjoy Advantages

Judge Elbert H. Gary, chairman United States Steel Corporation, sailed on the Mauretania at noon Wednesday, Feb. 7, intending to take the Mediterranean trip and be absent from this country about two months. Before leaving his office, he made the following statement:

The present demand for steel products in the United States and in many of the foreign nations is remarkable. It exceeds the expectations of the most sanguine a year ago. The ability fully to supply this demand is not sufficient to keep production up to manufacturing capacity.

Demand for domestic uses and for purposes of export are equally good. Bookings on hand are unusually large, payments are prompt, prices are firm, and if nothing unexpected and unnecessary happens there is no reason to suppose there will be a let-up in our business for several months at least.

The unfavorable situation in France, Germany and in other foreign countries looms large at present, but there are reasons to believe these troubles will be settled without serious damage to the financial and economic conditions of the United States. Certainly, if the Congress of the United States will permit the Chief Executive to apply the policies which he has outlined, our country at least, and probably others, will soon emerge from the clouds and storms which are conspicuous abroad.

I am naturally an optimist, for I know what the total producing capacity of this country is compared with other countries. It is great and growing larger, and there is and always will be a market for all that can be produced. We have only to take advantage of our opportunities. Have we sense enough to do this? That is the question. I think it can be answered in the affirmative. Otherwise it is doubtful if I would be leaving the country.

The mechanism of boiler scale formation is being studied at the Pittsburgh experiment station of the Bureau of Mines. The work covers scale formation in steam boilers, including the effect of temperature, pressure, character of surfaces and concentration of the water.

Rosenfeld, Hillas & Co., Pty., Ltd., 400 Collins Street, Melbourne, Victoria, Australia, desire to import "foundry sundries." No specifications or details are available at this writing.

## CONTINENTAL FURNACES IDLE

### More Blast Furnaces Blown Out or Banked, Due to Ruhr Disturbances

(By Cable)

LONDON, ENGLAND, Feb. 6.—Additional blast furnaces have been blown out or banked in France, Luxembourg and Belgium, as a result of French occupation of the Ruhr.

In France the Société Anonyme des Aciéries de Micheville has banked two furnaces at Micheville and de Wendel et Cie. has banked one at Gros Moyeuve (Moselle).

In Luxembourg Hadir has blown out one furnace at Differdange. The Société Anonyme d'Athus-Grivegne has blown out one at Steinfort. The Société Anonyme d'Ougrée-Marihay has blown out one furnace at Rodange. It is expected that other furnaces will be banked at Steinfort and Differdange. Esch-sur-Alzette is introducing short time at Differdange. Steel manufacture generally is seriously affected and unemployment is increasing.

In Belgium, the Société Anonyme des Laminoirs, Hauts Fourneaux, Forges, Fonderies et Usines de la Providence has blown out one furnace at Marchienne-au-Pont. The Société Anonyme Metallurgique de Sambre et Moselle, at Montigny-sur-Sambre, has blown in one furnace.

## Wages and Cost of Living

Figures of the National Industrial Conference Board show that average hourly earnings, based on 23 industries employing about 550,000 workers, advanced from 49.5c. in September to 49.9c. in October and 50.2c. in November. These may be compared with 23.9c. in July, 1914. Similarly, average weekly earnings advanced from \$23.71 in September to \$24.31 in October and \$24.60 in November, compared with \$12.30 in July, 1914. Weekly earnings are thus exactly 100 per cent above the pre-war level, while hourly earnings are 110 per cent above pre-war level, showing that the effective number of hours of work per week has fallen off by about 9 per cent.

Because of slight advances in the cost of living during the past few months, the wages in the fall of 1922 just about kept even with cost of living figures. Inasmuch, however, as wages are much higher with relation to 1914 than is cost of living, the purchasing power of hourly wages in the fall of 1922 was 33 per cent greater than in July, 1914. For weekly wages, the purchasing power in November, 1922, was 27 per cent above that of July, 1914.

According to figures of the United States Bureau of Labor Statistics, the cost of living in the United States in December was 69.5 per cent higher than the average for 1913. This is an increase from the 66 to 67 per cent prevalent through the greater part of 1922, and is accounted for mainly by increases in the cost of food, fuel and furniture.

## Automobile Bodies and Parts

According to the 1921 census of manufactures, the business of making automobile bodies and parts had fallen off heavily from 1919. Of the 153,182 persons engaged in the industry in 1919, only 79,607 remained in 1921. The products manufactured fell in the two years from \$692,171,000 to \$407,917,000. Salaries and wages decreased from \$213,924,000 to \$125,952,000. The individual compensation, however, advanced from \$1,397 average in 1919 to \$1,582 in 1921.

Although there was a shrinkage as compared with 1919, the figures all showed a marked advance over 1914, at which time the number of persons engaged was 53,954, the amount of salaries and wages \$54,553,000, or \$1,011 per person, and the value of product \$129,601,000. In 1921 Michigan was the leading State in value of products, followed in order by Ohio, New York, Indiana, Pennsylvania and Illinois.



# Prices Finished Iron and Steel, f.o.b. Pittsburgh

For additional prices, see page 444

## Plates

Sheeted, tank quality, base, per lb.....2.20 to 2.35c.

## Structural Material

Beams, channels, etc.....2.15c. to 2.25c.

## Iron and Steel Bars

Soft steel bars, base, per lb.....2.15c. to 2.25c.

Refined iron bars, base, per lb.....2.75c.

## Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb..2.75 to 2.90c.

Hoops, light gage, under 1 in. wide.....3.25c.

Bands, base, per lb.....2.75c. to 2.90c.

Strips, base, per lb.....2.75c. to 2.90c.

## Cold-Finished Steels

Bars and shafting, base, per lb.....2.65c.

Strips, base, per lb.....4.50c.

## Wire Products

Nails, base, per keg.....\$2.70 to \$2.80

Galvanized nails, 1 in. and over.....1.50 over base

Galvanized nails, less than 1 in.....2.00 over base

Bright plain wire, base, No. 9 gage per 100 lb..\$2.55

Annealed fence wire, base, per 100 lb.....2.70

Spring wire, base, per 100 lb.....3.50

Galvanized wire, No. 9, base, per 100 lb.....3.15

Galvanized barbed, base, per 100 lb.....3.35 to 3.45

Galvanized staples, base, per keg.....3.35 to 3.45

Painted barbed wire, base, per 100 lb.....3.00 to 3.10

Polished staples, base, per keg.....3.00 to 3.10

Cement coated nails, base, per count keg.....2.20 to 2.30

Woven fence, carloads (to jobbers).....70 1/2 per cent off list

Woven fence, carloads (to retailers).....68 per cent off list

## Bolts and Nuts

Machine bolts, small, rolled threads..60 and 5 per cent off list

Machine bolts, small, cut threads...50 and 10 per cent off list

Machine bolts, larger and longer...50 and 10 per cent off list

Carriage bolts, 3/4 x 6 in.:

Smaller and shorter, rolled threads,

Cut threads.....50, 10 and 5 per cent off list

Longer and larger sizes.....50 per cent off list

Lag bolts.....60 and 5 per cent off list

Plow bolts, Nos. 1, 2 and 3 heads...50 and 10 per cent off list

Other style heads.....20 per cent extra

Machine bolts, c.p.c. and t. nuts, 3/4 x 4 in.:

Smaller and shorter.....45 per cent off list

Larger and longer sizes.....45 per cent off list

Hot pressed square or hex. blank nuts...\$3.25 to \$3.50 off list

Hot pressed nuts, tapped.....3.25 to 3.50 off list

C.p.c. and t. sq. or hex. nuts, blank.....3.25 to 3.50 off list

C.p.c. and t. sq. or hex. nuts, tapped.....3.25 to 3.50 off list

Semi-finished hex. nuts:

9/16 in. and smaller, U. S. S....75, 10 and 5 per cent off list

3/4 in. and larger, U. S. S....70, 10 and 2 1/2 per cent off list

Small sizes, S. A. E.....80 and 5 per cent off list

S. A. E., 5/8 in. and larger.....75 and 5 per cent off list

Stove bolts in packages.....80 and 5 per cent off list

Stove bolts in bulk.....80, 5 and 2 1/2 per cent off list

Tire Bolts.....50, 10 and 10 per cent off list

## Cap and Set Screws

Milled square and hex. head cap screws...75 per cent off list

Milled set screws.....75 per cent off list

Upset cap screws.....75 and 10 per cent off list

Upset set screws.....80 per cent off list

## Rivets

Large structural and ship rivets base, per 100 lb.....\$3.00

Large boiler rivets, base, per 100 lb.....3.10

Small rivets.....65 and 10 to 65 and 5 per cent off list

## Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb....2.90c.

Spikes, 1/2 in. and smaller, per 100 lb.....3.50c.

Spikes, bent and barge, base, per 100 lb.....3.50c.

Track bolts, base, per 100 lb.....3.85c. to 4.50c.

Tie plates, per 100 lb.....2.45c. to 2.60c.

Angle bars, base, per 100 lb.....2.75c.

## Welded Pipe

### Butt Weld

Inches	Steel	Black	Galv.	Inches	Iron	Black	Galv.
1/4	47	21 1/2		1/4 to 3/8	11	+39	
1/2	53	27 1/2		1/2	22	2	
3/4	58	44 1/2		3/4	28	11	
1	62	50 1/2		1 to 1 1/2	30	13	
1 to 3	64	52 1/2					

## Lap Weld

2	57	45 1/2	2	23	7
2 1/2 to 6	61	49 1/2	2 1/2	26	11
7 to 8	58	45 1/2	3 to 6	28	13
9 to 12	57	44 1/2	7 to 12	26	11

### Butt Weld, extra strong, plain ends

1/4	43	26 1/2	1/4 to 3/8	+19	+54
1/4 to 3/8	49	32 1/2	1/2	21	7
1/2	55	44 1/2	3/4	28	12
3/4	60	49 1/2	1 to 1 1/2	30	14
1 to 1 1/2	62	51 1/2			
2 to 3	63	52 1/2			

### Lap Weld, extra strong, plain ends

2	55	44 1/2	2	23	9
2 1/2 to 4	59	48 1/2	2 1/2 to 4	29	15
4 1/2 to 6	58	47 1/2	4 1/2 to 6	28	14
7 to 8	54	41 1/2	7 to 8	21	7
9 to 12	48	35 1/2	9 to 12	16	2

To the large jobbing trade the above discounts are increased by one point, with supplementary discount of 5 per cent.

## Boiler Tubes

Lap Welded Steel	Charcoal Iron
1 1/4 in.	21 1/2
2 to 2 1/4 in.	33
2 1/2 to 3 in.	44
3 1/4 to 13 in.	49
1 1/4 in.	+12
1 1/2 to 1 3/4 in.	+2
2 to 2 1/4 in.	8
2 1/2 to 3 in.	13
3 1/4 to 4 1/2 in.	15

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

## Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	55	2 1/2 and 2 3/4 in.	35
1 1/4 and 1 1/2 in.	47	3 in.	39
1 3/4 in.	31	3 1/4 to 4 in.	44
2 and 2 1/4 in.	31	4 1/4 in. and 5 in.	36

## Hot Rolled

3 in. ....41 | 3 1/4 to 4 in. ....46

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

## Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list  
Carbon 0.30 to 0.40, base.....83 per cent off list  
Plus usual differentials and extras for cutting.

## Seamless Locomotive and Superheater Tubes

Cents per Ft.	Cents per Ft.
2-in. O.D. 12 gage.....14	2 1/4-in. O.D. 10 gage.....19
2-in. O.D. 11 gage.....15	3-in. O.D. 7 gage.....34
2-in. O.D. 10 gage.....16	1 1/2-in. O.D. 9 gage.....13 1/2
2 1/4-in. O.D. 12 gage.....16	5 1/2-in. O.D. 9 gage.....53
2 1/4-in. O.D. 11 gage.....17	5 1/2-in. O.D. 9 gage.....55

## Tin Plate

Standard cokes, per base box.....\$4.75

## Terne Plate

(Per package, 200-lb.)

8-lb. coating.....\$9.30	25-lb. coating I. C....\$14.25
8-lb. coating I. C.....9.60	30-lb. coating I. C....15.25
15-lb. coating I. C.....11.80	35-lb. coating I. C....16.25
20-lb. coating I. C.....13.00	40-lb. coating I. C....17.25

## Sheets

### Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c. to 2.75c.

### Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c. to 3.50c.  
Regular auto body sheets, base (22 gage), per lb.....4.70c. to 5.00c.

### Galvanized

No. 28 (base), per lb.....4.35c. to 4.65c.

### Tin-Mill Black Plate

No. 28 (base), per lb.....8.50c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

## Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic..\$0.325	Buffalo.....\$0.265	St. Louis.....\$0.43	Pacific Coast.....\$1.50
Philadelphia, export..0.235	Cleveland.....0.215	Kansas City.....0.735	Pac. Coast, ship plates 1.20
Baltimore, domestic...0.315	Cleveland, Youngstown	Kansas City (pipe)...0.705	Birmingham.....0.69
Baltimore, export.....0.225	Comb.....0.19	St. Paul.....0.60	Memphis.....0.385
New York, domestic....0.34	Detroit.....0.29	Omaha.....0.735	Jacksonville, all rail..0.50
New York, export.....0.255	Cincinnati.....0.29	Omaha (pipe).....0.705	Jacksonville, rail and water.....0.415
Boston, domestic.....0.365	Indianapolis.....0.31	Denver.....1.27	New Orleans.....0.515
Boston, export.....0.255	Chicago.....0.34	Denver (pipe).....1.215	

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 20c. to 40c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2 1/4c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

# Prices of Raw Materials, Semi-Finished and Finished Products

## Ores

Lake Superior Ores, Delivered Lower Lake Ports	
Old range Bessemer, 55 per cent iron.....	\$5.95
Old range non-Bessemer, 51½ per cent iron.....	5.20
Mesabi Bessemer, 55 per cent iron.....	5.70
Mesabi non-Bessemer, 51½ per cent iron.....	5.05
Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore	
Iron ore, low phos., 55 to 58 per cent iron in dry Spanish or Algerian.....	11.50c.
Iron ore, Swedish, aver. 66 per cent iron.....	9.5c. to 10c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus.....	30c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus.....	29c.
Manganese ore, Brazilian or Indian.....	33c. to 34c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal.....	\$7.50 to \$8.50
Chrome ore, basic 48 per cent Cr <sub>2</sub> O <sub>3</sub> , crude per ton, c.i.f. Atlantic seaboard.....	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS <sub>3</sub> , New York.....	60c. to 70c.

## Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown per gross ton

Rolling billets, 4-in. and over.....	\$38.50 to \$40.00
Rolling billets, 2-in. and under.....	40.00
Forging billets, ordinary carbons.....	45.00 to 47.50
Wire rods, common, soft base, No. 5.....	47.50 to 50.00
Wire rods, screw stock.....	\$5 per ton over base
Wire rods, carbon 0.20 to 0.40.....	\$3 per ton over base
Wire rods, carbon 0.41 to 0.55.....	\$5 per ton over base
Wire rods, carbon 0.56 to 0.75.....	\$7.50 per ton over base
Wire rods, carbon over 0.75.....	\$10 per ton over base
Wire rods, acid.....	\$15 per ton over base
Sheet bars, Bessemer.....	\$39.50 to \$40.00
Sheet bars, open hearth.....	39.50 to 40.00
Slabs.....	39.50 to 40.00
Skelp, grooved, per lb.....	2.10c. to 2.20c.
Skelp, sheared, per lb.....	2.10c. to 2.20c.
Skelp, universal, per lb.....	2.10c. to 2.20c.

## Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton.....	\$43.00
Rails, light new steel base, per lb.....	2.15c. to 2.25c.
Rails, light, rolled base, per lb.....	2.00c.
Spikes, 9/16-in. and larger, base, per 100 lb.....	\$2.90
Spikes, ½-in. and smaller, base, per 100 lb.....	3.50
Track bolts, base, per 100 lb.....	3.85
Tie plates, per 100 lb.....	\$2.45 to \$2.60
Angle bars, per 100 lb.....	2.75
Bars, common iron, base, per lb.....	2.25c. to 2.50c.
Bars, rail steel reinforcing base, per lb.....	2.00c.
Ground shafting, base, per lb.....	3.05c.
Cut nails, base, per keg.....	\$3.15

## Automobile Sheets

Prime quality, subject to 15 per cent "seconds" arising. Prices based on No. 22 gage Pittsburgh auto body quality.	
Regular auto body quality.....	4.70c. to 5.00c.
Deep drawing auto body quality.....	4.95c. to 5.25c.
Extra deep drawing auto body quality.....	5.20c. to 5.50c.
Flat fender, hood, door and apron or splash guard stock.....	4.95c. to 5.25c.
Crown fender and cowl, deep drawing.....	5.20c. to 5.50c.
Crown fender, cowl and radiator casing, extra deep drawing.....	5.45c. to 5.75c.

## Sheet Extras

Sheet steel extras for various finishes and qualities, to be added to base price of black sheets (O. P. C. R. & A.)	
Bessemer refined.....	\$0.25
Bessemer special.....	0.50
Blued elbow stock.....	0.25
Blue range steel.....	0.70
Blued stove pipe stock, No. 25 ga. and lighter.....	0.20
Blued stove pipe stock, No. 24 ga. and heavier.....	0.50
Enameling stock.....	0.50
Full cold rolled japanning stock.....	0.25
Full cold rolled blued stove pipe stock.....	0.40
Full cold rolled blued stove stock.....	0.60

## Engine Manufactures in 1921

Census figures for the production of steam, gas and water engines in 1921 show a great falling off from 1919, the value of product having declined from \$464,775,000 to \$199,499,000. The number of persons engaged in the industry decreased from 96,286 to 43,726 and their compensation dropped from \$136,347,000 to \$72,260,000.

The number of engines manufactured is given in 1921 as 399,856, compared with 836,206 in 1919 and 418,526 in 1914. The total indicated hp. fell off by a greater proportion than the number of engines, the

Full pickled, full cold-rolled and annealed.....	\$0.75
Locker stock.....	0.25
Special locker stock.....	0.70
Metallic furniture stock.....	
Plus 5 per cent for resquaring.....	1.00
Nickel plating stock, oiled.....	1.50
Range steel.....	0.50
Single pickled.....	0.45
Extra box annealed.....	0.15
Deoxidizing.....	0.15
Circle shearing.....	
16 gage and heavier.....	30 per cent
17-19 gage.....	35 per cent
20-21 gage.....	40 per cent
Liming.....	\$0.10
Oiling.....	0.10
Patent leveling.....	0.25
Resquaring.....	5 per cent
Roller leveling.....	\$0.10
Bow socket sheets.....	0.75
Extras for automobile sheets to be added to price of regular auto body quality, No. 22 gage base f.o.b. Pittsburgh.	
Deep drawing.....	\$0.25
Extra deep drawing.....	0.50
O. H. flat fender and hood.....	0.25
O. H. crown fender deep drawing.....	0.50
O. H. crown fender extra deep drawing.....	0.75

## Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica per ton f.o.b. Illinois and Kentucky mines.....	\$20.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica per ton, f.o.b. Illinois and Kentucky mines.....	21.50

## Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania.....	\$43.00 to \$46.00	\$38.00 to \$41.00
Ohio.....	40.00 to 42.00	35.00 to 38.00
Kentucky.....	40.00 to 42.00	37.00 to 40.00
Illinois.....	43.00 to 45.00	40.00 to 42.00
Missouri.....	48.00 to 50.00	38.00 to 43.00
Ground fire clay, per net ton.....		5.50 to 8.00

## Silica Brick:

Pennsylvania.....	42.00
Chicago.....	47.00
Birmingham.....	48.00
Ground silica clay, per net ton.....	7.50 to 9.50

## Magnesite Brick:

Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.).....	65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.).....	40.00

## Chrome Brick:

Standard size, per net ton.....	50.00
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## Alloy Steel

S. A. E. series Numbers	Bars 100 lbs.
2100 (¼% Nickel 10 to 20 per cent carbon).....	\$3.00
2300 (¾% Nickel).....	5.50
2500 (5% Nickel).....	8.00
3100 (Nickel Chromium).....	4.50
3200 (Nickel Chromium).....	6.25
3300 (Nickel Chromium).....	8.50
3400 (Nickel Chromium).....	7.50
5100 (Chromium Steel).....	4.00
5200 (Chromium Steel).....	7.25
6100 (Chromium Vanadium bars).....	5.25
6100 (Chromium Vanadium spring steel).....	5.00
9250 (Silico Manganese spring steel).....	4.15
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium).....	5.25
Chromium Molybdenum bars (0.70-1 Chromium, 0.25-0.40 Molybdenum).....	5.25
Chromium Molybdenum spring steel (0.50-0.70 Chromium, 0.15-0.25 Molybdenum).....	4.75

Above prices are for hot-rolled alloy steel bars, forging quality, per 100-lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are \$10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of \$10 per gross ton; on billets smaller than 2½-in. sq. the net ton bar price applies.

23,948,000 hp. of 1919 having given way to 9,298,000 hp. in 1921. This decrease was particularly marked in large engines, there having been only 87 built of 5000 hp. and over in 1921, against 317 in 1919 and 100 in 1914.

The 1921 production, so far as numbers go, consisted mainly of internal combustion engines, there being about 314,000 of this group, half of which were automobile engines. This, of course, does not include automobile engines sold with the cars. Tractors accounted for more than 74,000 engines; water wheels, etc., for 2990, while there were over 8500 steam engines and turbines built.



# NON-FERROUS METALS

## The Week's Prices

Cents Per Pound for Early Delivery							
	Copper, New York		Straits Tin	Lead		Zinc	
	Lake	Electro-lytic*	New York	New York	St. Louis	New York	St. Louis
Jan. 31.....	15.12½	14.75	39.87½	8.15	8.15	7.47½	7.12½
Feb. 1.....	15.12½	14.75	40.00	8.10	8.10	7.45	7.10
2.....	15.12½	14.75	39.85	8.10	8.10	7.45	7.10
3.....	15.12½	14.75	....	8.10	8.10	7.40	7.05
4.....	15.12½	14.75	40.00	8.10	8.10	7.40	7.05
5.....	15.12½	14.75	40.12½	8.10	8.10	7.40	7.05

\*Refinery quotation; delivered price ¼c. higher.

## New York

NEW YORK, Feb. 6.

The markets are not quite so active but are strong. Demand for copper continues good with prices exceedingly firm. Sales of Straits tin have been moderate at steady prices. The lead market is a little quieter but strong. There has been a slight easing in the zinc market.

**Copper.**—Demand for electrolytic copper is not quite as heavy as it was late in January, but the volume of business booked and the amount of inquiry continue excellent. The minimum price is unchanged at 15c., delivered, with some sellers asking and obtaining 15.12½c. These prices cover delivery into the second quarter. The volume of business taken for export is also good and demand comes from all quarters. Lake copper continues in good demand at 15.12½c., delivered.

**Copper Averages.**—The average price for Lake copper for the month of January, based on daily quotations in THE IRON AGE, was 14.85c., New York. The average price of electrolytic copper was 14.52c., refinery, or 14.77c., delivered.

**Tin.**—There has been a fairly active competition among some sellers of Straits tin for orders, buyers having been rather scarce. There were one or two sellers in the past week who pressed the market rather hard and this resulted in fair sales. The largest business was done last Friday, Feb. 2, on which day 300 tons was sold. The principal event having a bearing on the market was the announcement of the statistics for January, showing deliveries into consumption of 6625 tons, with 3354 tons in stock and landing on January 31. The deliveries were considerably larger than had been anticipated. Yesterday and today the market has been quiet but fairly firm with Straits tin quoted today at 40.12½c., New York. The London market today is from £2 to £3 per ton lower than a week ago, the market being depressed. The quotation today for spot standard was £183 12s. 6d.; for future standard, £185 12s. 6d., and for spot Straits, £186 12s. 6d. Arrivals thus far this month have been 255 tons, with 9815 tons reported afloat.

**Lead.**—The market in general is quiet with prices firm in the West and easier in the East. The leading interest is reported filling orders at its established quotation at 8c., New York, while in the outside market business is being done at 8.10c. to 8.20c., New York. The St. Louis market is firm at 8.10c. on sales made by independent producers. It is reported and fairly well established that about 1500 tons of lead has been purchased for importation from Spain.

**Zinc.**—Demand for prime Western is not quite as heavy as a week or two ago and the market is a little easier. A fair amount of business has been done and the market is considering some good sized inquiries. Prime Western for early delivery is quoted at 7.05c., St. Louis, for early or February delivery, with spot metal scarce. The New York quotation for the same position is 7.40c.

**Antimony.**—Chinese metal in wholesale lots for early delivery is quoted at 7.12½c. per lb., New York, duty paid, with the market strong. Future delivery metal has been sold on a basis of 7c., c.i.f., New York.

**Aluminum.**—Virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, is quoted 23c. to 24c., per lb., New York, duty paid, by importers of the foreign product. The basis on which business is being done in sales of the domestic product is not made public.

**Old Material.**—The market is quite active and values are higher. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	14.50
Copper, heavy and wire.....	13.50
Copper, light and bottoms.....	12.00
Heavy machine composition.....	11.25
Brass, heavy.....	9.50
Brass, light.....	7.25
No. 1 red brass or composition turnings...	10.50
No. 1 yellow rod brass turnings.....	8.25
Lead, heavy.....	6.75
Lead, tea.....	5.50
Zinc.....	5.00

## Chicago

FEB. 6.—Tin has declined while lead and zinc have advanced. Export sales have strengthened zinc, that metal being very sensitive to foreign demand. Lead buying has eased up and, while prices are held firmly, buyers believe the market is at or near the peak. Among the old metals red brass and lead pipe have advanced. We quote, in carload lots, lake copper, 15.25c.; tin, 41c.; lead, 8.35c.; spelter, 7.10c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 12.25c.; copper bottoms, 10.50c.; red brass, 9.75c.; yellow brass, 7.50c.; lead pipe, 6.50c.; zinc, 4.75c.; pewter, No. 1, 25c.; tin foil, 27c.; block tin, 34c., all buying prices for less than carload lots.

## St. Louis

FEB. 6.—The market for lead ruled strong and higher at 8.15c., car lots, while slab zinc was firm at 7.10c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 3c.; lead, 3c.; pewter, 15c.; tin foil, 20c., tea lead, 2c.; aluminum, 9c.

## Stocks of Bituminous Coal

WASHINGTON, Feb. 5.—The following preliminary statement regarding the amount of commercial stocks of bituminous coal throughout the country as of Nov. 1, 1922, and Jan. 1, 1923, was issued today by Federal Fuel Distributor F. R. Wadleigh:

Preliminary figures from a canvass of commercial stocks of bituminous coal undertaken by the Department of Commerce and the United States Geological Survey, under authority of the Federal Fuel Distributor, indicate that on Nov. 1, 1922, commercial consumers and dealers had in storage approximately 32,000,000 net tons of bituminous coal and on Jan. 1, 1923, 36,000,000 net tons, the latter amount being equivalent to 25 to 26 days' supply for the entire country. A weekly consumption of well over 9,000,000 tons is also indicated by the complete figures, as against an average weekly production of about 11,000,000 tons since Jan. 1, 1923.

## Meetings of Iron and Steel Institute

The annual meeting of the Iron and Steel Institute will be held on May 10 and 11 at the house of the Institution of Civil Engineers, Great George Street, London, S. W. 1, England.

The autumn meeting will be held at Milan, Italy, about the middle of September. The invitation of G. E. Falck, president of the Associazione Fra Gli Industriali Metallurgici Italiani, who is honorary vice-president of the institute, to meet in Italy was accepted recently by the Council. At the conclusion of the Milan meeting, it is proposed that visits be made to metallurgical centers and to hydro-electric power stations in Italy, with a tour including Rome, Naples, Genoa and Turin.

## PERSONAL

Percival Chrystie has been elected president of the Taylor-Wharton Iron & Steel Co., High Bridge, N. J., to succeed the late Knox Taylor. Mr. Chrystie was formerly vice-president and has been acting president since Mr. Taylor's death. He was born in High Bridge, attended the local school and also the Leal school of Plainfield, N. J., and Turner's Academy, Pittsfield, Mass. He started to work for the company as office boy during his school vacations. Going into the shops, he progressed through various departments until he became inspector. Then he went into the sales end and introduced the use of manganese steel in the anthracite coal regions of Pennsylvania. Returning to the plant, he worked up to superintendent of the steel foundry, then secretary and treasurer and finally vice-president, a position he held for many years. As president of the Taylor-Wharton Iron & Steel Co., he is also president of its subsidiaries, William Wharton, Jr., & Co., Inc., Easton, Pa., Tioga Steel & Iron Co., Philadelphia, and Philadelphia Roll & Machine Co., Philadelphia. Mr. Chrystie is a member of the New Jersey State Board of Conservation and Development, a member of the American Iron and Steel Institute, American Institute of Mining and Metallurgical Engineers, the Engineers' Club of New York, the Railroad Club of New York and the Manufacturers' Club of Philadelphia.



PERCIVAL CHRYSTIE

Samuel M. Buck of High Bridge, has been elected a director of the Taylor-Wharton Iron & Steel Co. to fill the unexpired term of Knox Taylor. Mr. Buck is works manager of the High Bridge plant and of the William Wharton, Jr. & Co. plant at Easton, Pa., and was chosen to represent the employee stockholders.

W. W. Lukens, who, about two years ago, retired from the presidency of the Alan Wood Iron & Steel Co., Philadelphia, on account of ill health, has returned to the company as vice-president in charge of sales. Mr. Lukens spent a considerable time in Europe.

The Earl of Middleton, a director of the Barrow Hematite Steel Co., Ltd., Barrow-in-Furness, Lancashire, England, has arrived in the United States for a business trip and is spending a few days of this week at the home of W. S. Pilling, Philadelphia iron merchant. Mr. Pilling will leave on Friday for Florida to be gone about a month.

W. H. Manning has been elected treasurer of the Wheeling Steel Corporation to succeed D. A. Burt, who resigned recently to become head of Hazlett & Burt, Wheeling investment banking firm. Mr. Manning has been treasurer Whitaker-Glessner Co., a subsidiary of the Wheeling Steel Corporation.

W. J. Stoop, vice-president in charge of operations of the Wheeling Steel Corporation, has been elected a director, succeeding Andrew Glass, resigned.

P. D. Brown has been appointed general sales manager of the Poldi Steel Corporation of America with headquarters at 115 Broadway, New York, succeeding George H. Grundy, resigned. For some time past Mr. Brown has been acting in the capacity of district sales manager for the corporation at Baltimore, Md., and for many years previous to that he was manager of the Baltimore branch of the Crucible Steel Co. of America. The Poldi corporation also announces the appointment of L. C. Gosselin assistant general sales manager.

Thomas J. McAndrew will have charge of the Baltimore branch.

B. L. Worden has been elected director and vice-president of the Cutler-Hammer Mfg. Co. to fill the vacancy caused by the resignation of A. W. Berresford. Mr. Worden was the organizer and president of the Worden-Allen Co., Milwaukee, and the Lackawanna Bridge Co., Buffalo, which interests he has recently disposed of. During the late war he was general manager of the ship building department of the Submarine Boat Corporation, the shipyard at Newark Bay having been built under his supervision.

Lawrence K. Berry, who resigned on Feb. 1 from the Warner & Swasey Co., Cleveland, has been appointed sales manager of the Detroit Twist Drill Co., Detroit.

C. J. Stilwell has been appointed domestic sales manager of the Warner & Swasey Co., Cleveland, succeeding L. K. Berry, resigned. Mr. Stilwell has been foreign sales manager of the company and for the present will look after the foreign sales as well as domestic.

Blake C. Hooper, Minnesota Supply Co., Pioneer Building, St. Paul, Minn., has been appointed special railroad agent in the Northwest for the Independent Pneumatic Tool Co., Chicago, instead of for another company as erroneously announced some weeks ago.

Charles C. Boyden, formerly with B. Nicoll & Co., is New England representative of Crocker Bros., New York, pig iron, ferromanganese, coke, etc., with offices at 53 State Street, Boston, fifth floor.

I. V. Amerman, who has been connected with the St. Louis office of the David J. Joseph Co. and manager for the last few years, has been transferred to the general offices in Cincinnati and promoted to become assistant to the president. He takes up his new duties on Feb. 15. J. E. Wolcott, assistant manager of the St. Louis office, will be directly in charge there, with Mr. Amerman supervising. The St. Louis office will be moved from the Frisco Building to the plant at 3140 Hall Street after March 1.

Sam Heppenstall has been elected chairman of the board of directors of Heppenstall Forge & Knife Co., Pittsburgh, and C. W. Heppenstall has been elected president to succeed him. S. B. Heppenstall continues as vice-president and Floyd Rose as secretary.

At the annual meeting of the executives of the Pollak Steel Co., Cincinnati, Emil Pollak, for many years the president of the company, was elected chairman of the board of directors. Maurice E. Pollak, formerly vice-president, succeeds the former as president. and Julian A. Pollak was re-elected vice-president. Edward J. Schriever and Charles Judah were re-elected secretary and treasurer, respectively. Mr. Judah was also elected to the board to fill the vacancy caused by the retirement of Bernard E. Pollak, formerly vice-president. D. E. Sawyer has retired as general sales manager, but up to the present time he has made no announcement of his plans. The general sales management, formerly handled in the New York office, will be conducted from Cincinnati, but the company will maintain a sales office in the Equitable Building, New York, with Clyde Hicks as Eastern representative.

Pickands, Mather & Co., Cleveland, announce that Samuel E. Bool and Frank Armstrong have been admitted to membership in that firm. Mr. Bool has been associated with the firm 35 years in various departments, and Mr. Armstrong has also been connected with it many years in various capacities in the coal mining department. He was recently assistant to G. D. Cameron, who resigned as manager of the firm's coal department late last year, and has succeeded Mr. Cameron as manager of that department.

Edward A. Lembeck, for several years in the sales department, Republic Iron & Steel Co., in its Youngstown, Pittsburgh and Cleveland offices, has joined the sales department of the Wellman Bronze Co., Cleveland, manufacturer of non-ferrous metal castings.



## OBITUARY

### David Reeves

DAVID REEVES, president of the Phoenix Iron Co., Phoenixville, Pa., for 44 years, died suddenly at his home in Phoenixville on Monday, Feb. 5. He was approaching his 71st birthday. Mr. Reeves was the third of his family to have served in the presidency of the Phoenix company, his father, Samuel J. Reeves, and his grandfather, David Reeves, having preceded him.

Mr. Reeves was dressing in his home preparatory to leaving for the general offices of the company in Philadelphia when he collapsed and he was dead when members of his family reached his side. Death was due to heart failure.

Mr. Reeves was born March 27, 1852, and attended Rensselaer Polytechnic Institute at Troy, N. Y., being graduated as a civil engineer. He immediately entered the firm of Clarke, Reeves & Co., who were the predecessors of the Phoenix Iron Co., whose president he became upon its incorporation. He was then under 30 years of age.

Mr. Reeves had a thorough knowledge of the steel business and was a man of rare judgment and far vision, having piloted his company through many adverse periods. He commanded the greatest love and respect of those with whom he came into contact.

A widow, two sons and a daughter survive. The two sons, Samuel J. and William H., Jr., are associated in the business, the former as vice-president and purchasing agent of the Phoenix Iron Co. and the latter as treasurer and general manager of the Phoenix Bridge Co., a subsidiary. The daughter is Miss Mary T. Reeves. A brother, William H. Reeves, is vice-president and general superintendent of the iron company.

DAVID COCHRANE, inventor and first builder of the open feed water heater which bears his name, died on Jan. 24. Mr. Cochrane was born in Sawkey, Clackmannanshire, Scotland, in 1850, and in his early years worked as a pattern-maker on the Clyde. He came to the United States in 1879, entering the employment of Ferris & Miles. Shortly afterward he went with the Harrison Safety Boiler Works, then the builders of a sectional cast iron boiler. His open heater, brought out in 1883, was designed to protect boilers from the effects of cold, unpurified feed water. His contribution to steam engineering consisted in focusing attention upon the more efficient utilization of exhaust steam for heating buildings and for heating and purifying water to be used for feeding boilers and for industrial purposes. As early as 1895, he advocated the withdrawal of steam in course of expansion for feed heating and similar purposes, thus anticipating the present day movement to provide all large turbines with bleeder connections.

WILLIAM J. METCALF, assistant to the president Yale & Towne Mfg. Co., Stamford, Conn., died at his home in that city on Jan. 29, after a brief illness. Mr. Metcalf was born in Mitchell, S. D., 41 years ago and entered the employ of the Yale company when a youth as salesman and was promoted to manager of the Washington office in 1904. Four years later he was transferred to Philadelphia, and finally was made assistant general sales manager of the company in Stamford.



DAVID REEVES

JOHN WARREN SARGENT, aged 66, engineer and designer of stationary steam engines, died on Jan. 30 at the Hope Hospital, Providence, R. I., following a brief illness. Mr. Sargent graduated in 1878 from the Massachusetts Institute of Technology. He became associated with the William Cramps Shipbuilding Works, Philadelphia, and later with the Dixon Mfg. Co., Scranton, Pa., where he eventually became chief engineer and designer. In 1895 he went to Providence where he was engaged in engine design and research work.

ABRAM C. OVERHOLT, one of the founders of the cast iron pipe works which now is the Scottdale, Pa., plant, U. S. Cast Iron Pipe & Foundry Co., died at his home in Scottdale on Jan. 31. He was a director and member of the executive committee of that company, a director of the Scottdale Savings & Trust Co. and of the First National Bank of Scottdale, and also was actively interested in several coal companies. He was 65 years old.

WILLIAM B. CRAFTS, for 43 years associated with Wetherell Brothers Co., Cambridge, Mass., died at his home in Brookline on Jan. 26, aged 76. Mr. Crafts was office manager of the company, and with one exception possibly served in the steel industry longer than anybody in greater Boston.

ELISHA H. WILCOX, for several years connected in various capacities with the Grinnell Automatic Sprinkler Co., Providence, R. I., died at his home in Auburn, R. I., on Jan. 28. He was 71 years of age, and was born in East Greenwich, R. I. For the past few years Mr. Wilcox had been manager of the Boston office of the company.

WILLIAM P. WAUGH, consulting engineer for the H. H. Robertson Co., Pittsburgh, and known particularly through his development of skylights and the solution of ventilation problems for industrial plants and public buildings, died at his home at Sewickley, Pa., on Jan. 15. He was born in Hedrick, Iowa, and attended Iowa State College at Ames, Iowa. He began his professional career in railroad construction work, was later connected with the Fort Scott Hydraulic Cement Co., Fort Scott, Kan., then with the McCormick Construction Co. on the St. Louis water works tunnel under the Mississippi River and for twelve years with the James G. Wilson Mfg. Co. as sales manager in the New York district. For two years he was connected with Irving F. Orr of the Clason Architectural Metal Works, Providence, R. I., in the development of what was then known as the Waugh type of skylight. He then joined the H. H. Robertson Co.



WILLIAM P. WAUGH

JOSEPH REYNOLDS, secretary Newman-Andrew Co., 26 Cortlandt Street, New York, died on Feb. 3. Mr. Reynolds became connected with the Newman company in 1909 in a clerical capacity and worked up to the secretarial position which he had held for ten years.

RASTUS S. RANSOM, Jr., president Ransom Engineering Co., Hazleton, Pa., and graduate of Colorado School of Mines, 1913, was accidentally killed while cleaning his revolver on Jan. 10. Mr. Ransom was born in New York in 1890.

JOHN ARMSTRONG, president Armstrong Bros. Tool Co., Chicago, died on Jan. 28 at Chattanooga, Tenn., while en route by automobile to Florida to join his family.

HARRY W. HAND, formerly president of Wm. Cramp & Sons Ship & Engine Building Co., and before that with I. P. Morris Co., died unexpectedly Jan. 26, aged 64 years.

## British Iron and Steel Market

Prices Sharply Advanced—Continental Demand Heavy and Continental Quotations Withdrawn—Shipbuilding Slack  
(By Cable)

LONDON, ENGLAND, Feb. 6.

Pig iron is strong, with Cleveland foundry iron short in supply. Makers are sold out, for the current month, of No. 3 G. M. B. and are not disposed to quote beyond March and April delivery. The domestic trade is quieter, but there is increasing Continental demand. Two additional blast furnaces have been re-started, making a total, for the North East Coast now in blast, of 42. There is expanding demand for hematite and good sales to France, Belgium and Italy at advancing prices.

Finished steel generally is harder, with the works well booked up. Some makers of light plates are disinclined to quote, while others require two months for delivery.

Clyde shipbuilding output in January consisted of four vessels, aggregating 15,905 tons gross register.

France, Belgium, Luxemburg and Germany are not quoting for export. Germany is cancelling French and Belgian contracts. Czechoslovakian merchant bars are offered at £7 15s. (1.62 c. per lb.) f.o.b. Additional blast furnaces in France, Luxemburg and Belgium have been blown out, steel manufacture generally is seriously affected and unemployment is increasing.

Tin plate is firm on rising costs and shortage of tin plate bars. Makers generally are asking 21½s. (\$5.03) basis, f.o.b. Option contracts for March to June have been sold at 21¼s. (\$4.97), and stock plates

at 21s. (\$4.91), both basis, f.o.b. The recent oil plate order from America, mentioned in the last cable, has not yet been placed. [This was understood to be for the Standard Oil Co.]

Galvanized sheets are strong, with increasing demand. The works are now quoting April as the earliest delivery date.

Black sheets are dearer, with sustained Far Eastern demand. Japanese specifications are being sold at £17 10s. (3.66c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at \$4.68 per £1, as follows:

Durham coke, delivered	£1 14s.	& £2 10s.*	\$7.96 & \$11.70
Cleveland No. 1 foundry	5 10 (nominal)		25.74
Cleveland No. 3 foundry	5 5		24.57
Cleveland No. 4 foundry	5 0		23.46
Cleveland No. 4 forge..	4 15		22.23
Cleveland basic .....	4 15		22.23
East Coast mixed.....	5 2½		23.98
Ferromanganese .....	15 0		70.20
Ferromanganese* .....	15 0		70.20
Rails, 60 lb. and up...	8 0	to 8 5	37.44 to 38.61
Billets .....	7 0	to 8 0	32.76 to 37.44
Sheet and tin plate bars,			
Welsh .....	7 13¾	to 8 1	35.98 to 37.67
Tin plates, base box...	1 1	to 1 1½	4.91 to 5.02
			C. per Lb.
Ship plates .....	8 15	to 9 5	1.83 to 1.93
Boiler plates .....	11 0	to 11 10	2.30 to 2.46
Tees .....	9 15	to 10 5	2.04 to 2.14
Channels .....	9 0	to 9 10	1.88 to 1.99
Beams .....	8 15	to 9 5	1.83 to 1.93
Round bars, ¾ to 3 in.	10 0	to 10 10	2.09 to 2.19
Galvanized sheets, 24 g.	19 0	to 19 5	3.97 to 4.02
Black sheets, 24 gage..	13 5		2.77
Black sheets, Japanese			
specifications .....	15 5		3.19
Steel hoops .....	11 0	& 12 10*	2.30 & 2.61*
Cold rolled steel strip,			
20 g. ....	23 0		4.80
Cotton ties, Indian speci-			
fications .....	15 0		3.13

\*Export price.

### Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

No quotations.

### Effect of Ruhr Invasion in Increasing Demand and Advancing Prices—Italy a Large Buyer

LONDON, ENGLAND, Jan. 25—During the past two weeks quite an important change has come over the iron and steel trades of this country. It is more or less a direct result of the upheaval on the Continent, brought about by the French occupation of the Ruhr district. Large sales of coal and fuel have been made to Germany and to other export buyers, to such an extent that prices on this side have been forced up, with the consequent effect upon iron and steel prices. Moreover, with Continental supplies of iron and steel almost cut off, buyers have turned to the United Kingdom to cover their immediate requirements. Large sales of pig iron have been made for export as well as for the home trade, and as the advancing costs preclude ironmasters from expanding output, there is a scarcity of the better grades of pig iron in sight, and what little is about is held for high figures. No. 1 Cleveland is unobtainable. For No. 3 GMB sellers ask anything from 97s. for home consumption up to 105s. for export. The other grades are proportionally dearer. Hematite has been participating in the boom, though perhaps not on quite such an important scale, but nevertheless some good business has been done and works have their order books well filled. The feature of the export buying has been strong demand from Italy. East coast mixed numbers are quoted at 97s. 6d. for either home or export.

Prices of finished iron and steel continue to mark an upward path, but not a great deal of business has been moving, except in specialties. Galvanized sheets and black sheets are in very large demand, and the prices of these advance almost daily. Some big business has been moving in shipplates, but only as a result of the recent accumulation of shipbuilding orders and values of these are stiffer. Tinplates are a very firm market, with a good all-around business, but business in the ordinary merchant steel still leaves room for improvement. Nevertheless the individual orders coming in are of larger proportions than has

been the case for a long time, and serves to show that the world generally is short of steel.

### World Production of Ships

In the annual summary published by Lloyd's Register of Shipping statistics are given of the world's output of merchant vessels in 1922. The total, at 2,467,084 tons, shows a decrease of nearly 2,000,000 tons from 1921. Practically every country showed a reduction, with the exception of Germany, whose total tonnage increased by over 66,000 tons. The principal outputs were as follows:—Germany, 574,264 tons; France, 184,509 tons; Holland, 163,132 tons; United States, 119,138 tons; Italy, 101,177 tons, and Japan, 83,419 tons.

### Increasing Use of Metal Lath in Home Construction

Over 200 salesmen and agents of the General Fireproofing Co., Youngstown, attended the eighth annual convention Friday and Saturday of last week of the company's fireproofing division, held in Youngstown. Officials, including President W. H. Foster and Vice-President and General Manager S. S. French predicted capacity business through the first half, extending possibly through the third quarter. The country is short of schools and public buildings, while industrial construction is still behind needs, it was pointed out.

Emphasis was placed upon the growing use of metal lath and metal partitions in home construction, especially in locations subject to fire hazard.

Wharton Clay, commissioner of the Associated Lath Manufacturers, declared sales of metal lath increased 140 per cent last year, as compared with the preceding year. James Hamilton of Syracuse, N. Y., was awarded a prize of \$100 for making the best statement to the convention with reference to handling fireproofing sales. The convention closed the evening of Feb. 3 with a banquet, when \$29,766.56 was distributed in the form of bonuses.



## NEW TRADE PUBLICATIONS

**Micarta Gears.**—To acquaint the industrial gear user with the advantages of Micarta gears, the Westinghouse Electric & Mfg. Co. has issued a 20-page booklet, folder 4506, entitled "Salient Facts on Silent Gears." The booklet describes Micarta gears and pinions and gives photographs and data describing some of their applications; tables of gear data, etc., enabling the gear user to judge whether or not they are applicable to his machinery.

**Oil Burners.**—F. J. Ryan & Co., Philadelphia, Bulletin 213 on Mirco oil burners, considerably elaborated upon over the bulletin previously issued. It contains information upon the simple way of determining the amount of air necessary for proper combustion and the correct proportions of air with oil.

**Cupolas.**—J. W. Paxson Co., Philadelphia, Bulletin No. 41, superseding No. 26, describes with illustrations the Paxton Collian cupola. It contains considerable data on the cupola melting unit of an iron foundry.

**Measuring Fuel Waste.**—Uehling Instrument Co., Paterson, N. J. This 12-page folder refers to the loss in steam turbine economy due to air leakage into the condenser system and in the sensible heat in the flue gases lost up the chimney. It describes a combined barometer and vacuum recorder with its chart, which measures the condenser performance throughout the day.

**Reclaimed Pneumatic Tools.**—Master Tool Co., 203 St. Clair Avenue, Cleveland; catalog 30 pages. Lists spare parts for riveting and chipping hammers and bench and sand rammers and describes certain master parts for these tools made by the company. Pneumatic tools are reclaimed either completely or partly, as required.

**Calorimeters.**—Cutler-Hammer Mfg. Co., Milwaukee. Publication 3010, 8½ x 11, 8 pages; describes and illustrates the use of the Thomas calorimeter, which records total heating values of gas graphically. A schematic arrangement of piping and meters and a schematic wiring arrangement are included in the illustrations.

**Paint.**—Hockaday Co., Chicago. Booklet of 55 pages, 8½ x 10½ in., entitled "Hockaday Paint Mileage"; includes an outline of the special features of the company's product, preparations of walls and detailed specifications for architects and contractors.

**Milling Cutters.**—Lovejoy Tool Co., Inc., Springfield, Vt. Booklet of 14 pages, 6 x 9 in., describing the company's inserted tooth milling cutters of the face milling, side milling, and plain or face milling types. Plain arbor mills, staggered tooth grooving mills and deep slotting cutter are among other equipment described and illustrated.

**Feed Water Heaters.**—H. S. B. W.-Cochrane Corporation, Philadelphia. Booklet of 60 pages, 4 x 9 in., "Feed Water Heaters in Their Relation to Steam Plant Efficiency." Not primarily descriptive of apparatus, but rather a presentation of the theory and practice of boiler feed water heating.

**Buffalo Forge Products.** Portable forges, stationary forges, drilling machines, reborring machine, hand-power punches, shears and bar cutters, bending machines, woodworking machines, tire upsetters, and power blowers and exhausters, described and illustrated in catalog No. 800 of the Buffalo Forge Co., Buffalo, N. Y. General and detail views of the equipment are shown and specifications given. The catalog is 8½ x 11 in., 180 pages, and is indexed for ready reference.

**Almanac.**—Colonial Supply Co., 217 Water Street, Pittsburgh. A publication of unusual novelty and originality, compiled along the lines of old-time almanacs, but somewhat unique in industrial advertising. The last pages cover a guide to engineering and specialties handled by the company.

**Combustion Engineering Equipment.**—International Combustion Engineering Corporation, 45 Broad Street, New York. In this 16-page pamphlet, 8½ x 11 in., have been gathered condensed descriptions of all of the products handled by the above company. These include the Frederick multiple retort stoker; Lopulco pulverized fuel systems; Coxo traveling grate stoker; Type E stoker; Quinn fuel oil burner; Lopulco coal dryer; Type K stoker; self-contained stoker; Type H stoker; Green chain grate stoker; Green pressure waterback, together with several ash conveyors and small devices.

**Sand Blast Machines.**—J. W. Paxson Co., Philadelphia. Sand blast machinery is described and illustrated in a 4-page circular, 8 x 10 in., setting forth special automatic and self-contained features. Specifications and descriptions of the Paxson dust collector are also given.

**Die Heads.**—Eastern Machine Screw Corporation, New Haven. Pocket size, 3½ x 5½ in., closely printed, edition of the company's 96 page catalog. A section describes and illustrates the H & G self-opening die heads and another is devoted to H & G standard die heads of the rotating and non-rotating types, parts and numbers of the various styles being fully given. The model SS threading machine, chasers for H & G die heads, instructions for installing and adjusting, correct grinding of chasers, and the H & G chaser grinder are dealt with in other sections. Several pages are devoted to data pertaining to standard threads.

**Welding and Cutting Apparatus.**—Alexander Milburn Co., Baltimore. Booklet 3¼ x 6 in., 25 pages, describing the company's acetylene generators, compressing plants, torches, regulators and other materials.

**Steam Turbines, Pumps, Compressors and Blowers.**—De Laval Steam Turbine Co., Trenton, N. J. Catalog P, 24 pages, 4 x 9 in. Under the title of Plant and Products, the various departments of the plant and the products of the company are briefly described and illustrated. The products include steam turbines, direct current generator sets, small turbo alternators, centrifugal pumps, blowers and compressors, double helical speed reducing gears and marine geared turbines.

**Boiler Furnace Economies.**—Quigley Furnace Specialties Co., 26 Cortlandt Street, New York. In Bulletin No. 53 of 4 pages, 8½ x 11 in., November, 1922, a method of reconstructing and patching boiler furnace walls is detailed, which makes use of old furnace linings, which are crushed and then mixed with "Hytemplate."

**Lighting Data.**—Edison Lamp Works, General Electric Co., Harrison, N. J. Bulletins, supplementing others of the same character already issued by the company, in part as follows; No. L. D. 142, index 63, Lighting of Woodworking Plants, by A. D. Bell; L. D. 141, index 99, Automobile, Garage and Display Room Lighting, by L. C. Porter and M. Horner, Jr.; L. D. 144, index 91, Street Lighting with Mazda Lamps, by R. E. Greiner of the lighting service department, and others covering the lighting of paper and pulp mills, food industries and textile mills. Additions are also announced to bulletins on office lighting, light and safety and the manufacture of the Mazda lamps. These are not widely distributed, but individuals interested may secure copies by writing to the department of publicity of the company.

**Holz Thetascope.**—Herman A. Holz, 17 Madison Avenue, New York. In a 12-page folder is described an instrument for determining the lubricating efficiency of oils. What we are interested in is adhesion, the molecular attraction exerted between bodies in contact, in this case oil and metal, because lubrication of metal surfaces depends upon the adhesion of the oil to the metal and not upon the cohesion of the oil molecules to each other. The pamphlet takes it up mathematically and then goes into the practical value of the angle theta between the surface of the liquid and the metal.

**Asbestos Products.**—Acme Asbestos Covering & Supply Co., Fulton and Elizabeth Streets, Chicago. In catalog No. 27 of 36 pages, 4½ x 6½ in., are described pipe and boiler coverings, asbestos goods, "Bestoruber" roofing, fireproof paints, roofing paints, mineral wool and "Acemetylene" flooring. The various products are described and priced, and brief instructions are given for their use.

**Instruction Manual: De Laval Centrifugal Pumps.**—De Laval Steam Turbine Co., Trenton, N. J. 12-page pamphlet, 8½ x 11 in., giving instructions as to ordering of pumps and spare parts, installing of pumps and piping, priming and starting the pump, and disassembling and assembling it. Tables are given of pertinent characteristics of the type of pump considered, which is a small single stage centrifugal.

**De Laval Small Single Stage Centrifugal Pumps.**—De Laval Steam Turbine Co., Trenton, N. J. 12-page pamphlet, 8½ x 11 in., describing a small type single stage centrifugal pump and its component parts. This pump is made in 1½ and 2-in. sizes, for capacity of 5 gal. per min. and 10 ft. head up to 130 gal. per min. and 150 ft. head. Particularly helpful is a sectional drawing showing all the parts indicating what they are for.

**Holbeck Pulverized Coal Systems.**—Bonnot Co., Canton, Ohio. In a 12-page folder, 7½ x 10½ in., Bulletin 60, is described a system for handling powdered fuel, consisting of crusher, conveyor, dryer, pulverizer and blower, by which the pulverized coal is transmitted to the various heating units which are to use it. These systems have been applied to air melting furnaces, annealing ovens, sheet and pair furnaces, forge furnaces, copper smelters, billet heating and steam boilers. They are reported as offering distinct advantages in plants where consumption exceeds 20 tons of coal per day or an equivalent amount of oil.

## JAPANESE MARKET HIGHER

### Lower Prices by Government Works May Affect Merchants—Copper Market Rises

TOKIO, JAPAN, Jan. 10.—Imports by Japan of electrolytic copper in November showed an increase of 500 tons over the previous month. Production decreased and consumption increased. Stocks on hand were reduced by 500 tons.

The price of 42.13 yen at which the Osaka Arsenal purchased, was the lowest point reached by the market and the quotation has improved slowly during the past month. At present electrolytic copper is quoted at yen 45 for buyers and yen 44.50 for sellers. As a result of the purchase by the Osaka Arsenal, stocks in Tokyo, Osaka and elsewhere have almost been cleared, although the Sumitomo, the Furukawa, the Kuhara and other companies still hold a little.

Export of copper and brass plates from Japan to India has been resumed lately, although there is not a large margin of profit. The favorable features are the exhaustion of the supply of munitions scrap in Britain, an improvement in prices and a rise in the exchange value of the rupee.

The Fujita-gumi Co., which is about to develop the mining of iron sulphide ores, has met with a delay. Further capital is needed for the completion of the railroad to the company's mine. The producers of copper sulphide ores, who feared the competition of the new producer in supplying the needs of fertilizer manufacturers, are relieved at this turn of events.

The prices of steel materials quoted by the Yawata Government Iron Works are as follows:

	Forward Yen	Spot Yen
Bars:		
Rounds .....	97	112
Squares .....	97	120
Fats .....	97	127
Plates:		
Less than 2 bu. (0.24 in.) .....	97	112
Heavier than 2 bu. (0.24 in.) ..	92	107
Channels .....	99	122
Angles .....	98	117

The Yawata Works used to charge the same price for spot delivery and forward delivery, but the change

has been made in order to get orders from merchants, who fear a decline of prices in the near future. For the time being, it is absolutely impossible to import foreign goods at prices below 100 yen, and the step taken by the foundry must be very effective in checking importation. However, as many private companies in this country are unable to produce at less than 110 yen, the reduction of price is a severe blow to such companies as the Nippon Kokan Kaisha, the Osaka Seitetsu Kaisha, and the Tokai Kogyo Kaisha.

The stocks of iron and steel in Tokio, Osaka, Kobe, Yokohama and other cities at the end of November totaled 141,288 tons, a decrease of 3258 tons from September. Iron plates decreased 5330 tons and iron bars 1672 tons, while tin plates and French nails increased.

Transactions in pig iron are few, but stocks are gradually decreasing. The Wanishi works having been damaged, output has decreased considerably. On the Tokio market Kyomipo No. 1 is quoted at 59 to 60 yen and Wanishi No. 1 at 61 to 62 yen.

Pig iron remaining in stock in Japan amounts to 165,465 tons, showing a decrease by 3200 tons since Nov. 11. The total includes 18,100 tons in Tokio and Yokohama, 4300 tons in Nagoya, 53,700 tons in Osaka and Kobe, 9100 tons in Kyushu, 64,400 tons in Manchuria and Korea, 4900 tons in Hokkaido and 1000 tons in other places.

In Kobe and Osaka tin plates are quoted at 12 yen for 100-lb. boxes and 22.20 yen for 170-lb. boxes, the former showing an improvement by 1.10 to 1.20 yen and the latter by 30 to 40 sen since the beginning of the month.

Merchants in Japan may lose from 1,200,000 to 1,500,000 yen through the action of the Yawata Government Steel Works in lowering the selling price of steel materials. Some merchants have begun short selling because of their financial position. The large merchants who are affected by the lowering of the selling price, have about 70,000 tons of stock and contracts for imports of foreign steel bringing their total holdings up to about 100,000 tons. It is thought that merchants may cancel a portion of the orders they have placed with the Government works.

## STIFFENED BELGIAN PRICES

### Early Effects of Ruhr Invasion Due to Fuel Scarcity and Adverse Exchange

ANTWERP, BELGIUM, Jan. 17.—Prices of coke remain high and quantities are so limited that iron masters are seeking British coke. Prices for the latter have also increased on account of American demand for coke in England and also on account of important purchases of coal in England by the Germans.

The high rate of exchange is making the import prices of British coke prohibitive. Yorkshire furnace coke (washed) quoted 37s. to 38s., c.i.f., Antwerp, is costing 145 Belgian francs per Belgian ton on cars at Antwerp. Durham furnace coke is offered at 42s. 6d. to 43s. 6d., c.i.f. Antwerp. Against this we have the official prices of the Belgian coke syndicate as follows: Washed coke, 155 fr.; half washed coke, 120 fr.; ordinary coke, 108 fr., f.o.b. producing works.

As long as coke remains high, prices for pig iron will not be reduced. The general opinion of the iron masters is that they will be compelled to set their prices even higher. Actual prices may be stated as follows: Belgian, Luxemburg and Lorraine ordinary foundry pig iron with 2.5 to 3.5 per cent Si. and 1.7 to 2 per cent P., 315 to 320 fr., delivered free at the station of the consumer. Pig iron with 2.5 to 3.5 per cent Si. and 1 per cent P., maximum 330 fr. These prices mean respectively about \$20 and \$20.75 per gross ton, f.o.b. Antwerp. Quantities available are not large.

In late weeks German competition for steel products was present in Belgium. Nearly all these offers

have been withdrawn in the meantime. The average prices at works for domestic consumption are as follows: Bars, 460 fr.; rails, 490 fr.; rods, 590 fr.; Bessemer ingots, 350 fr.; blooms, 385 fr.; billets, 410 fr.

Works of the Grand-Duchy du Luxembourg are offering their products as follows: Bessemer ingots, 360 fr.; blooms, 385 fr.; billets, 415 fr. Prices for material of Lorraine origin are respectively 360, 385 and 410 fr.

H. L. Campbell, assistant professor of metallurgical engineering, the University of Michigan, Ann Arbor, will deliver an address on "Modern Methods of Making Metal Mixtures" before the Chicago Foundrymen's Club at the City Club, Chicago, the evening of Feb. 10. His remarks will be illustrated by lantern slides.

The National Association of Farm Equipment Manufacturers will hold its thirteenth annual convention at the Statler Hotel, Cleveland, Oct. 24, 25 and 26. For a number of years the meeting has taken place at Chicago.

Powdered coal for generation of steam is to be tested in cooperation with the Combustion Engineering Corporation by the Bureau of Mines at the River Rouge plant of the Ford Motor Co. on the largest boilers so far constructed.

The New York Testing Laboratories has installed a new automatic 100,000-lb. Tinius Olsen testing machine, for handling tensile tests, compression tests and transverse tests.



Fuel Gas Question in Steel Industry  
(Concluded from page 405)

of natural gas and coke oven gas were possible and they have proved that, under right furnace conditions, one cu. ft. of coke oven gas will do the same work as one cu. ft. of natural gas. Of course, it must be kept in mind that a furnace must be changed to suit the new

Table II

Equivalent Gas and Heat Values for the Same Flame Temperatures.\* 60 per cent Air Excess.

	Producer Gas	Natural Gas	Coke Oven Gas	Duo-Gas
Temperature of gas entering furnace..	1,300	Cold	Cold	Cold
Temperature of air entering furnace..	1,850	1,640	1,520	1,440
Heat value of gas, B.t.u. ....	133	1,018	425	426
Actual ratio, duo-gas-1 .....	3.2	0.42	1	1
Amount of waste gases per cu. ft. gas .....	1.929	11.723	4.755	4.445
Theoretical flame temperature .....	3,400	3,400	3,400	3,400
Actual flame temperature .....	2,900	2,900	2,900	2,900
Temperature of bath .....	2,700	2,700	2,700	2,700
Difference .....	200	200	200	200
Equivalent value of gas, duo-gas-1....	2.30	0.38	0.93	1.0
Amount of heat units which will do the same work as 426 B.t.u. in duo-gas .....	306	367	395	426
Equivalent B.t.u. ....	0.72	0.86	0.93	1

\*All temperatures in deg. Fahr.

fuel, because the new fuel will not adapt itself to the old furnace. If this is done and is done right, there is no reason why coke oven gas or duo-gas cannot replace natural gas and give better results than the old fuel.

Using the Waste Gases

Another item which has been talked about quite frequently in recent years is the utilization of the waste gases. There is no doubt that the heat in the waste gases should be made use of, because it is a gain which does not cost anything. Table IV gives the amount of steam of 125 lb. gage pressure which can be raised from one pound of coal gasified in the gas producing machine. Comparison is made between coke oven gas,

Table III

Equivalent Gas and Heat Values for Different Flame Temperatures.\* 60 per cent Air Excess.

	Producer Gas	Natural Gas	Coke Oven Gas	Duo-Gas
Temperature of gas entering furnace..	1,300	Cold	Cold	Cold
Temperature of air entering furnace..	1,850	1,850	1,850	1,850
Heat value of gas, B.t.u. ....	133	1,018	425	426
Actual ratio, duo-gas-1 .....	3.2	0.42	1	1
Amount of waste gases per cu. ft. gas .....	1.929	11.723	4.755	4.445
Theoretical flame temperature .....	3,400	3,550	3,610	3,660
Actual flame temperature .....	2,900	3,050	3,110	3,160
Temperature of bath .....	2,700	2,700	2,700	2,700
Difference .....	200	350	410	460
Equivalent value of gas, duo-gas-1....	5.30	0.50	1.05	1.00
Amount of heat units which will do the same work as 426 B.t.u. in duo-gas..	705	509	446	426
Equivalent B.t.u. ....	1.65	1.20	1.05	1.00

\*All temperatures in deg. Fahr.

duo-gas and producer gas. The figures in the first horizontal row are taken from actual practice, the coke ovens having been assumed to be combination ovens and that all the coke oven gas is used in the steel plant. In consideration, furthermore, was given to the blast

furnace gas which, to a certain extent, could be considered as a waste product from the coke ovens, coming from the coke.

The other data in Table IV were taken from curves on Figs. 3, 4 and 5. The steam raised, at 125 lb. gage pressure, contains 1192.2 B.t.u. per lb. Figuring on 70 per cent boiler efficiency, the resulting values are:

For coke oven gas, 0.23 lb. per lb. coal gasified.

For duo-gas, 0.97 lb. per lb. coal gasified.

For producer gas, 1.11 lb. per lb. coal gasified.

In this connection the following must be taken into account. The duo-gas process is, like every water gas process, an intermittent one. During the time that air is blown through the fuel, waste gases are formed, which can be made use of like the other waste gases. Actual tests have shown that every pound of coal will yield about 35 cu. ft. of these waste gases, which contain about 40 B.t.u. per cu. ft. This gas will burn at about 2400 deg. Fahr. The difference in heat contents in the waste gas and 800 deg. (see Fig. 4) being 50.72 — 15.72 or 35 B.t.u., the total heat in these waste gases amounts to 35 × (40 + 35) = 2625 B.t.u. (say 2600 B.t.u.) per pound of coal gasified. This quantity,

Table IV

Quantity of Steam Raised by the Waste Gases, referred to 1 lb. of Coal Gasified.

	Coke Oven Gas 5	Duo-Gas 25	Producer Gas 70
Cu. ft. of gas per lb. of coal..			
Amount of waste gases per cu. ft. (25% excess air).....	5.646	5.410	2.203
Total quantity of waste gases, cu. ft. ....	28.23	135.25	154.21
Heat in waste gases at 1300 deg. Fahr. per cu. ft. fuel gas, B.t.u. ....	165	160	65
Heat in waste gases at 800 deg. Fahr. per cu. ft. fuel gas, B.t.u. ....	87	94	38
Difference, B.t.u. ....	78	66	27
Total heat in waste gases, B.t.u. ....	390	1,650	1,890
Heat in steam at 125 lb. gage..	1,192.2	1,192.2	1,192.2
Lb. of steam generated at 70 per cent boiler efficiency....	0.23	0.97	1.11

added to that shown in the table (1650) will give a total available heat of 4250 B.t.u. which will furnish  $4250 \times 0.70 = 1192.2 = 2.5$  lb. steam. Since the amount of steam required in the gas producing machine is only 0.5 lb. per lb. of coal, 2 lb. remain, which can be used for other factory purposes.

Conclusion

It was shown that the old saying "a B.t.u. is a B.t.u." does not hold good any more, since it has been found that the efficiency of a gaseous fuel does not depend upon its heat value, but upon its pyrometric efficiency, the amount of waste gases generated and the velocity with which the gases travel over the bath. For this reason there is no danger in replacing natural gas by coke oven gas or by any other similar gas, thereby obtaining the same results with the same quantity of gas as before.

Combustion curves are shown, which enable the determination and comparison of those gases mostly used in the steel industry and which show that, outside of producer gas, natural gas has the lowest flame temperature of the gases taken into consideration. There is also given a table showing the amount of steam which can be raised by the waste gases from one pound of coal gasified, and which represents a net gain, thus permitting a considerable saving in expense.

Steel Corporations Pensions

Disbursements made by the United States Steel and Carnegie Pension Fund, established in 1911 and applicable to employees of the United States Steel Corporation and subsidiaries, made total disbursements of \$1,266,662 in 1922. This is a notable increase over the 1921 total of \$947,879, and is surprisingly large against the five-year total of \$2,234,411, for 1911 to 1915 inclusive. Present beneficiaries number 3886.

## BOOK REVIEWS

**Capital's Duty to the Wage-Earner.** By John Calder. Pages 326, 5 x 7½ in. Published by Longmans, Green & Co., New York. Price \$2.25.

Mr. Calder's work as an engineer and his experience as a manager of men in industry make his thinking on "the labor problem," as hackneyed speech calls it, worth far more than the familiar contributions of economists and research men. As general manager of the Remington Typewriter Co., general manager of the Cadillac Motor Car Co.'s works, adviser to textile companies, consulting engineer of Citroën Shell Works in Paris, and for the past three years manager of industrial relations for Swift & Co. at Chicago, he has the practical viewpoint and the benefit of years of contact with thousands of workmen. Sitting on the employer's side of the table has made him by no means deficient in appreciation of the worker's claims. Some of his conclusions will not be applauded by the type of employer who is willing to be classified as "hard-boiled," but that type is far less numerous than it used to be.

Mr. Calder has written this book, it would appear, because he believed things had come to a stage in industry at which a practical man might get a hearing and a hearing that would be of help. In his preface he calls it an "appeal to the able organizers of our present material prosperity, to the financial supporters of industry, and to the employers of the United States, their executives of every rank, and those fitting themselves for management and social service to glimpse a worthier capitalism and to substitute statesmanship for skilful opportunism, economic strategy and militancy." He calls for the "adoption of a true philosophy of labor relations and of a practice according with fact and with science which will be creditable to the genius and opportunities of the American people." As the title would indicate, Mr. Calder believes it is capitalism's move. Not government or "labor" is to show the way out, but those who decide what shall be done with the instruments of production.

In considering what the worker wants, the book reduces his desires to five main things: a steady job, adequate real wages, a good foreman, a voice individual and collective in settling his own conditions, and finally a chance to rise. For a number of reasons which he elaborates, one being that they have not succeeded as yet in securing the allegiance of more than one-seventh of the people in the manufacturing industry, Mr. Calder considers labor unionism as it now exists to be unequal to the task of getting for the worker what he wants. On the other hand, he is not impressed with the vision of employers' associations. The policies of the latter have followed three lines: 1. Anti-unionism; 2. Constructive cooperation with employees' unions; 3. Constructive cooperation with all employees in the plant. While employers' associations are showing an increasing interest in the third course and the larger employers are taking the lead, the great bulk of the small employers are referred to as still drifting, having neither affiliation with employers' associations nor with organized labor nor with their own employees as a body.

In chapters on The "Open" and "Closed" Shop, Claims of Capitalism, The Public, Capital and Labor, Organizing Production, Organizing Personnel Service, Organizing Economic Relationships, Employees' Representation, A Plan of Employees' Representation, Profit-Sharing, Ownership-Sharing and Management-Sharing and others, Mr. Calder discusses sanely and in a forward-looking way the practical steps in education, representation and administration of the executive and the human factors in industry, which have been found to promote the desired co-operation of capital and labor. He finds wise industrialists have no fear of intelligence; rather it is ignorance that alarms them. Hence they are more and more disposed to meet the worker's desire to know the reasons for things as they exist.

Mr. Calder does not strain for epigrammatic effect, but he does epigram with good effect. For example:

"Closed or open shop is not the real controversy; it is closed or open hearts." He considers the real issue to be one of a new spirit on both sides; "not of crooked economics in capitalism or of poor cards in the worker's hands."

While he is not committed to any particular form of cooperation, Mr. Calder's three years as manager of industrial relations for Swift & Co. naturally lead him to enlarge on features of the plan followed at Chicago. The trend of his thinking and the fairness of his judgment on the whole movement for employee representation are well indicated in the following:

In the writer's opinion not a few American employers through genuinely democratic employees' representation, with no implication of finality about its form, have made a good beginning for a new industrial day. They have done so without having to surrender any of the executive liberties necessary for the efficient operation of capitalism, and without predicating any immediate moral miracles, as a few have done under the guidance of industrial evangelists. Wise employers have not made too heavy a draft upon human nature as we know it. They have also taken care to let their workers "make their own mistakes," after affording them every opportunity for information. The workers, both union and non-union, on their part have shown no disposition to make serious mistakes and, though entirely free to do so, they have also been slow about committing their affairs to the tender mercies of union leaders whose performances had not been reassuring in the past, and whose intentions were sometimes plainly unsocial.

It is clear that a new unionism will be needed to capture the sympathies and support of not a few of the wage-earners and it may be forthcoming when the smoke of present controversies clears away. Meanwhile, protesting union leaders and objecting sociologists scornfully term the organization of all employees in a plant simply as employees there, "the company union." The name, however, will not hurt if the institution is acceptable to and is really desired by the employees and if it leaves them the fullest freedom of action. In any case, where it is sincerely utilized by employers in their labor issues, such informed, self-disciplined bodies including all of the wage-earners in a plant will have to be reckoned with in any labor movement of the future, and a new body of enlightened employee opinion will have to be taken into account as education in these is proceeding rapidly. Most of the unions have failed miserably in educating their own members and most employers have failed to sense what is on the worker's mind and to sympathize with it. They have also failed to distinguish between the follies and the honest mistakes of labor's official leaders.

The writer of this review would not omit expressing his gratification that John Calder has written this book. His high competence for the undertaking appears in every chapter. What he says is well worth the reading and the pondering of every man in industry who holds a place of responsibility. It is no mechanical scheme the author proposes. One article in his creed is that the Golden Rule is both good morals and good business. But obviously, as he says, it calls for "golden rulers." And where are they to be found? When and wherever found, they will interpret in the language of the spirit rather than of the letter the duty capital owes in this latter-day to the wage-earner in industry.

**Electric Brass Furnace Practice.** By H. W. Gillett and E. L. Mack. Pages 334, 6 x 9 in. Paper covers. Issued by the U. S. Bureau of Mines as Bulletin No. 202.

A complete discussion of the progress made in the application of electricity to brass and non-ferrous melting. All the successful commercial and other furnaces are discussed. Some of them are illustrated. One object of the report is to aid plants which have not yet taken up such melting by pointing out the types of furnaces available, describing their performance and indicating their possibilities and their limitations, and to encourage further experimentation with and the development and installation of electric brass furnaces.

An unusual use of the steel tank was its provision in a 1,000,000 gal. size as a water reservoir for the city of Kitchener, Ont. Built on a concrete foundation, the riveted structure is 90 ft. in diameter and 24 ft. high. It was fabricated and erected by the Horton Steel Works, Ltd., Bridgeburg, Ont.



## STEEL AND INDUSTRIAL STOCKS

### Sentiment Moves to Optimism Regarding Franco-Prussian Imbroglia—Week Ends in Recoveries

Save for the reversal in sentiment, which turned cheerful last Friday to regard French occupation as a possible forerunner of economic recovery in Europe, there was little change in the market tone of steel and industrial stocks. Irregularity ruled through the week, early firmness being followed by a reaction in which industrials showed remarkable power of resistance. Baldwin was depressed below 132 three times successively, but snapped back the moment pressure was released. Great Britain's acceptance of the debt funding plan caused a vigorous rally followed again by irregularity. Part responsibility for the rally may be ascribed to the Federal Reserve statement reflecting new strength in the domestic banking position, and also to the predicted rise in steel prices. Advances of a point or more were made in the more active issues on the week-end advance, attributable in large measure to the more cheerful view now taken of the unravelling of the Ruhr.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers ..	45 3/4	48	Int. Har.....	88 3/4	91
Allis-Chalm. pf....	94 3/4	95	Int. Har. pf.....	115 3/4	..
Am. B. S. & Fdy. 74	77	77	Lima Loco.....	59 1/2	61
Am. B. S. & F. pf. 108	..	..	Lima Loco pf.....	113	..
American Can....	80 3/4	84 3/4	Midvale Steel....	27	27 1/2
Am. Can pf.....	112	112 3/4	Nat.-Acme .....	11	11 1/4
Am. Car & Fdy. 178	180	180	Nat. En. & Sum. 66 3/4	68 1/4	..
Am. Car & F. pf. 125 3/4	..	..	Nat. E. & St. pf. 99 3/4	100	..
American Loco. 120 3/4	124 1/4	124 1/4	N. Y. Air Brake 27 1/2	29 1/2	..
Am. Loco. pf.....	121	121 3/4	Otis Steel.....	8 1/2	9 3/4
Am. Radiator.....	80	81 1/2	Otis Steel pf....	48	50
Am. Stl. Furnies. 35 3/4	38 1/2	38 1/2	Pressed Stl. Car 58	65	..
Am. Stl. Fd. pf. 103 1/4	103 3/4	103 3/4	Pressed Steel pf. 91	91 1/4	..
Baldwin Loco....	129 3/4	134 1/2	Ry. Steel Spring. 110	112	..
Bethlehem Steel. 60 3/4	..	..	Ry. Stl. Spg. pf. 115 1/4	..	..
Beth. Steel Cl. B 61	62 1/2	62 1/2	Replogie Steel....	24 3/4	26 3/4
Beth. Stl. 8 3/4 pf. 107 3/4	109	109	Republic .....	47	49 3/4
Brier Hill.....	19	..	Republic pf.....	89 1/4	90
Br. Em. Steel....	8 3/4	..	Sloss .....	46	47
Br. Em. Stl. 2 pf. 25	25 3/4	25 3/4	Sloss pf.....	78	..
Cambria Steel....	45	..	Superior Steel....	29 3/4	30 3/4
Chic. Pneu. Tool 83 3/4	86 3/4	86 3/4	U. S. Pipe.....	29	30 3/4
Colo. Fuel.....	25 3/4	26	U. S. Pipe pf....	69	70
Cruible Steel....	70 3/4	74 1/4	U. S. Steel.....	104	104 3/4
Gen. Electric....	181 3/4	190 3/4	U. S. Steel pf....	119	121 3/4
Gl. No. Ore Cert. 30 3/4	30 3/4	30 3/4	Vanadium Steel. 33 3/4	37 3/4	..
Gulf States Steel 80 1/2	84	84	Va. I. C. & Coke 53 3/4	54	..
Inland Steel.....	45	47	W'house Air Br. 109 3/4	110 3/4	..

### Industrial Finances

In connection with the acquisition of Midvale Steel and Ordnance Co. by the Bethlehem Steel Corporation, a plan has been proposed which will give Midvale 5 per cent convertible bonds a direct mortgage lien instead of the present collateral lien through stock and will provide for their assumption and guaranty by Bethlehem. Midvale property which is to be placed under the mortgage lien of the bonds as additional security has a book value of approximately \$21,000,000. Under the plan the bonds are convertible into Bethlehem common stock at the rate of \$500 par value of stock for each \$1,000 bond, this being in lieu of the present conversion privilege for Midvale stock on the same basis. Consent of the holders of two-thirds of the \$40,906,500 bonds is required for adoption of the plan, this consent to be evidenced by deposit of the bonds with Guaranty Trust Co.

In its report for the fiscal year ended Nov. 30, last, the Nash Motors Co. showed net profits of \$7,613,246, after expenses, depreciation, reserves and taxes. Business for the year totaled a gross volume of \$40,000,000, according to Charles W. Nash, president.

The Edward G. Budd Mfg. Co., Philadelphia, all-steel automobile bodies, has sold to banking interests \$7,000,000 in securities, which in turn have passed into investment hands. The securities consist of \$3,000,000 7 per cent cumulative preferred stock and \$4,000,000 6 per cent sinking fund convertible bonds dated Feb. 1 and maturing in 1938. The company now has a funded debt of \$6,122,000, consisting of \$5,197,000 direct obligation and \$625,000 in real estate mortgages. In addition to the preferred stock just issued the company has \$2,455,600 in common stock outstanding.

Stockholders of the Steel & Tube Co. of America soon will be asked to ratify an agreement to sell the company's assets to the Youngstown Sheet & Tube Co. The agreement provides that the 7 per cent preferred stock of the Steel & Tube company will be retired at 110 and accrued dividends. This stock was issued in 1919 in connection with the company's acquisition of the Mark Mfg., Harrow Spring and the Iroquois Iron companies.

The Youngstown Sheet & Tube Co. in its consolidated statement for the 11 months ended Nov. 30, 1922, as submitted to the New York Stock Exchange, shows a net income

of \$3,752,557 after expenses, depreciation and Federal taxes. Operating profit was \$7,104,674, other income \$1,096,076, and gross income \$8,200,750.

In the annual statement of the Reynolds Spring Co., Jackson, Mich., dated Dec. 31, 1922, operating results record another advance over all previous years. Net income amounted to \$247,425, after depreciation and Federal taxes, as compared with \$89,297 in 1921, \$64,786 in 1920, and \$69,108 in 1919. President Wiley R. Reynolds stated in his report that he expects net profits for 1923 to exceed those in 1922.

Total sales of the Western Electric Co. in 1922 broke all previous records, aggregating \$210,900,000, an increase of \$21,100,000 over the year previous, and \$4,800,000 greater than the former record year of 1920. Orders received during the last three months amounted to \$63,000,000, or \$5,000,000 more than the sales of the corresponding period of 1921. It is said that prospects for 1923 indicate an even greater volume of business.

In its fourth quarter report the Gulf States Steel Corporation showed net earnings of \$585,078 against \$74,610 in the same period of 1921. Net income, after taxes, amounted to \$399,942 against a deficit of \$11,937 in the previous year.

A third appraisal of the property of the Barney & Smith Car Co., Dayton, Ohio, has been made, resulting in a reduction of the appraised value to \$1,421,839.48. The property will be offered for sale Feb. 16.

The F. R. Lueck Mfg. Co., 262-264 Fifth Street, Milwaukee, manufacturer of wrenches and tools, has filed a voluntary petition in bankruptcy, admitting liabilities of \$28,992 and claiming assets of \$30,018. Patents, copyrights and trade marks are valued at \$11,905, and merchandise at \$10,052.

The entire assets of the defunct Barton Axle Co., Barton, Wis., will be offered for sale at public auction at the plant on May 12, 1923. The value is \$80,000.

The Jackson Furnace & Foundry Co., Jackson, Mich., last year sued the Walcott Lathe Co., also a Jackson concern for breach of contract, claiming \$172,000 damages. The jury recently granted \$103,000 and taxed the Walcott Lathe Co. the entire cost of the suit.

War contract claims of the United States Government against the Lincoln Motor Car Co., Detroit, will be settled for \$1,550,000 as decided in United States District Court Jan. 30. A settlement on this basis would leave the company enough money to pay its creditors 47c. on the dollar. The Government originally claimed \$9,188,561.

Profits of the General Fireproofing Co., Youngstown, Ohio, for 1922, after depreciation and dividends but before Federal taxes, were \$334,850.17, equivalent to about 20 per cent on the common stock. Federal taxes are estimated at \$30,000. Gross sales last year were \$6,297,123.87 of which \$3,247,227.35 represented shipments from the metal furniture department and \$3,022,896.52 from the fireproofing department.

December proved the best month of 1922 for the Worthington Pump & Machinery Corporation. Incoming business that month fell just short of \$2,000,000, bringing the total bookings for 1922 up to approximately \$16,000,000, contrasted with \$12,000,000 in 1921, and \$27,500,000 in 1920. The company's plants are operating on an average of 65 per cent of capacity.

Stockholders of the Westinghouse Air Brake Co., at a special meeting called for March 2, at Wilmerding, Pa., will vote on a proposed increase in the capitalization from \$30,000,000 to \$50,000,000. In the event of the increase being authorized, a stock dividend of 35 per cent on the present outstanding share capitalization will be declared. The management has no intention of issuing the remainder of the increased stock at present. It will be held in the treasury to be issued at future time as financing requirements arise. There is at present \$21,600 stock in the treasury. The authorized stock of the company today stands at \$30,000,000, par \$50, of which \$29,144,200 outstands.

The Eastern Machine Screw Corporation, New Haven, Conn., has increased its capitalization from \$500,000 to \$600,000.

The Hartford Iron Works, Inc., Hartford, Conn., has filed a petition in bankruptcy, giving liabilities as \$71,255, and assets as \$65,777, including real estate valued at \$24,000. The largest creditor is the City Bank & Trust Co., Hartford. William A. Clinton, 48 Victoria Road, West Hartford, is president and treasurer of the concern.

The Reynolds Spring Co., Jackson, Mich., in its annual report, shows net earnings for 1922, after all charges, including federal income tax and depreciation charges, of \$257,425.30, equal to \$2.75 per share on outstanding common stock. During the year all deferred dividends on both classes of preferred stock were paid up. The net earnings in 1921 amounted to \$89,297.15.

The New York Air Brake Co., according to a preliminary report, showed net profits for 1922 of \$1,000,000 or the equivalent of \$10 per share on its class A preferred stock. Its general balance sheet as of Dec. 31 showed net working capital of \$6,200,000.

### Plans of New Companies

The Quinn Oil Burner Co., Richmond, S. I., has been incorporated with capital stock of \$500,000 and is engaged in manufacturing oil burners and oil burning devices, particularly burners of the domestic type. It has a thoroughly equipped foundry and assembly plant, sufficient for present days, but it will be necessary to make extensions some time in the future. The principals are J. C. Quinn and D. G. Kindleberger. The original Quinn Oil Burner & Torch Co., of which W. R. Quinn was president, was taken over by the International Combustion Engineering Corporation, 43 Broad Street, New York, Mr. Quinn becoming manager of the fuel oil department.

The Dictaphone Co., care of R. H. Swartout, 140 Broadway, New York, has been organized to acquire the business of the dictaphone department of the Columbia Graphophone Co. Machinery and equipment have been installed in a leased building and it is expected that the business originally done by this department will be doubled under the new management. The company represents capital of \$1,400,000, totally subscribed and paid in. The plant is located at Bridgeport, Conn.

The Par-Con Co., Ltd., Bourse Building, Philadelphia, has been organized by W. Earl Parent, formerly mechanical engineer for the Miller Lock Co.; William A. Parent, formerly general manager for the Dexter Metal Mfg. Co.; and Walter M. Conard, formerly secretary and purchasing agent for the Miller Lock Co. The partnership will operate as material engineers for the mechanical development and sale of metal products, including finished and raw material of cast, sheet, bar, and wire products, also metal lockers, shelving and office equipment.

Vitrolite Products, Inc., care of Kent, Cummings & Means, Dun Building, Buffalo, has been incorporated with capital stock of \$55,000, to manufacture cement composition products. Immediate manufacturing will be done under contract, for which awards have already been let. The incorporators are: G. A. Brenner, F. E. Beluche, and C. De F. Cummings.

The Automatic Restaurant Appliance Corporation, 19 Madison Avenue, New York, recently incorporated under Delaware laws with capital stock of \$1,000,000, will manufacture machinery for restaurant kitchen service. This equipment will be manufactured by contract according to present plans, but it is possible that the parts will be let to contract and assembling done by the company. The management wishes to get in touch with concerns interested in making this machinery or its parts. The incorporators are: George M. Zeh, Weehawken, N. J.; Walter B. Beardsley, Nyack, N. Y.; and George Peterson, Brooklyn, N. Y.

Stockholders of the Federal Adding Machine Corporation have been notified by their protective committee, of which C. F. Leng is chairman, that the Federal Adding Machine, Inc., has been chartered at Albany, N. Y., with capital stock of \$500,000 to acquire the assets and business of the old company, recently purchased at public sale. Business will be conducted along the same lines following necessary readjustments.

### Industrial Items

The Standard Motor Car Co. has been reorganized under the laws of Delaware, with a capital of \$500,000. The Standard Steel Car Co. is no longer associated with the management. The company has taken over in addition to the old motor business, the automotive department of the Standard Steel Car Co., Butler, Pa. D. C. McCord, who was president of the old motor company continues as president of the new corporation.

Employment in Cleveland factories gained 2.3 per cent in January over December according to the monthly report of the Cleveland Chamber of Commerce and State-City Employment Bureau, compiled from reports from 100 plants employing 500 or more persons. January was the fourth consecutive month showing an increase. The gain in employment in iron, steel, and metal working plants was 3.4 per cent, automotive field 1.5 per cent, and in metals and metal products other than iron and steel 7.3 per cent.

The David Joseph Co., scrap merchant, with head offices in Cincinnati and branch offices and yards in a number of the steel centers, is now establishing a large scrap yard at Sciotoville, near Portsmouth, Ohio. Machinery for the preparation of scrap for the market has been moved from the yard formerly located at Chicago. The company plans to use the new yard as a source of supply for steel plants and blast furnaces operating in the southern Ohio and Ashland districts, as well as for the preparation of railroad materials for the general market.

### Canadian Car and Foundry Report

Orders on the books of the Canadian Car & Foundry Co., Ltd., Montreal, Que., at the present time amount to \$10,364,614, compared with \$818,745 a year ago. These figures were presented at the annual meeting of the company by President W. W. Butler who, outlining the extreme depression experienced by the company in the past two years, stated that during 1922 the company had built only nine freight and 15 passenger cars for standard gage railways. The company had, however, been able to get a certain amount of special business which, combined with a general cut in the organization, had enabled the company to make a fair showing in this year of depression, calling attention to the fact that, of the loss of about half a million for the year, well over half of this amount was to look after depreciation account. The report presented at the meeting covers the year ended Sept. 30, 1922, and in the first three months of the year the company handled business amounting to \$3,000,000, thus if the company were to receive no further business this year it would have orders in excess of \$13,000,000.

Confirmation of the order from the Canadian National Railways for \$7,500,000 worth of equipment placed with the Canadian Car & Foundry Co., was made at the meeting. Col. O. F. Harvey was elected to the board of directors.

### Standard Parts Co. Reorganization

Plans have been worked out for the reorganization of the Standard Parts Co., Cleveland, and have been presented to the stockholders for approval, following closely on the application made by the creditors' committee asking the court to order the sale of the plants. Under the proposed plan, a new company will be formed and there will be issued \$5,000,000 first mortgage and collateral trust 7 per cent sinking fund bonds; \$3,000,000 in 7 per cent cumulative preferred stock and 200,000 shares of no par common stock. The creditors are to be asked to accept as part payment of their claim \$5,000,000 in bonds and the remainder of the money needed to liquidate other items will be secured from the sale of stock to the present stockholders. Under the plan, the preferred stockholders will subscribe for 40 per cent of their present holdings in preferred stock of the new company and the present holders of common stock will subscribe for 20 per cent of their present holdings in preferred stock.

### American Engineering Co. Now Makes the Standard Electric Hoists

The American Engineering Co., Philadelphia, manufacturer of Taylor stokers and A-E-Co. marine auxiliaries, has taken over the Standard Crane & Hoist Co. and the patent and manufacturing rights to the mono-rail electric hoist with the low headroom formerly known as the Standard.

H. S. Valentine, chief engineer of the Standard Crane & Hoist Co., brings to the American Engineering Co. his more than 20 years' experience in the design and manufacture of hoists and the solution of material handling problems in practically every industry. He is directing the sales and supervising the manufacture of the hoists.

The American Engineering Co. has reorganized its No. 1 plant to accommodate the work of building and testing the hoists on a commercial basis and is now manufacturing them in quantity. The principal feature of the Standard hoist is the low headroom in which it will operate. It is built in capacities of from 1000 to 12,000 lb.

The Dictaphone Corporation has been organized as a separate company to acquire the business formerly known as the Dictaphone department of the Columbia Graphophone Co. Richard H. Swartout of Swartout & Appenzeller, New York, has been elected chairman of the board of directors; C. K. Woodbridge, for the past five years head of the Dictaphone organization and its sales manager, becomes president, while his assistant, L. C. Stowell, has been named secretary and assistant to the president. The directors include several men well known in business. They are: George A. Ball, treasurer Ball Bros. Glass Mfg. Co., Muncie, Ind.; Marsden J. Perry, chairman of board of directors Norfolk Southern Railroad Co.; R. J. Scoles, president Passaic National Bank & Trust Co., Passaic, N. J.; Paul Appenzeller, director American La France Fire Engine Co. and Intertype Corporation; H. R. Swartz, president Intertype Corporation; J. Russell Clarke, president American La France Fire Engine Co.; and Albert C. Andrews, vice-president Chase National Bank, New York.

Directors of the Steel & Tube Co. of America have approved the proposed sale of the company's properties to the Youngstown Sheet & Tube Co. The matter will now be submitted to a special meeting of stockholders on Feb. 25.



# Machinery Markets and News of the Works

## PROSPECTS BRIGHTER

### January a Good Month with Many Sellers of Machine Tools

#### Inquiries Coming from a Greater Diversity of Buyers, Indicating Reviving Industrial Activity

While machine-tool business with some in trade showed little or no gain over December, with others it was the best month since the depression set in late in 1920. The Cincinnati trade reports both orders and prospective business as decidedly encouraging. All indications are business is better in the Central West than in the East.

In the Cleveland and Detroit districts in particular, there is considerable activity. The Electric Auto Lite Corporation, the Chevrolet Motor Co. and the Owens Bottle Machine Co., all of Toledo, Ohio, have bought a number of tools each. The Ferro Foundry & Machine Co., Cleveland, is inquiring for 15 or 20 lathes for turning automobile pistons. Two Akron, Ohio, rubber companies are inquiring for about 10 machines for making molds. Another Ohio manufacturer has an inquiry out for 20 tools.

The Hooven, Owens & Rentschler Co. and the Her-

ring-Hall-Marvin Safe Co., Hamilton, Ohio, and the Newport Rolling Mill Co., Newport, Ky., have all been buyers at Cincinnati. An Indianapolis manufacturer also bought a number of tools.

The Ford Motor Co., Detroit, continues to negotiate for equipment. The Buick Motor Car Co., Flint, Mich., has bought about 10 machines. The Continental Motors Co., Muskegon, Mich., has bought two or three tools and is reported to be about to purchase a sizable list.

Railroad buying is on a moderate scale. The Louisville & Nashville has asked prices on about a dozen tools and the Big Four has added a number of tools to a recent list which is still pending. At Chicago several roads are seeking tools, but their inquiries are confined to small lots.

In the East there are no outstanding purchases, but prospects seem to be improving. The Worthington Pump & Machinery Corporation is "cleaning house" at several of its plants, disposing of large lots of surplus equipment, much of which was purchased for war uses. The Hyatt Roller Bearing Co., Harrison, N. J., is also disposing of surplus tools. Both of these companies presumably will come into the market soon for new tools. The General Electric Co. continues one of the most active buyers in the East, its latest inquiry being for four shapers.

## New York

NEW YORK, Feb. 6.

DEMAND for single tools or small lots continues fairly good, but there is an absence of large inquiries. The General Electric Co. is one of the principal buyers, as has been the case for the past month or two. One of its new inquiries is for four shapers. Liquidation of surplus stocks of machine tools by large manufacturers, especially by those who bought heavily of special purpose machines during the war, is going on and these plants are being made ready for the addition of new, cost-saving equipment. While the throwing on the market of many used machines temporarily hurts the sale of new machines, it is believed that the process of elimination of old tools in many plants will eventually bring about an increasing demand for production tools.

The Worthington Pump & Machinery Corporation is "cleaning house" at several of its plants, selling its surplus equipment, a good deal of which was put in for war work. Auction sales are being conducted at its Epping-Carpenter plant in Pittsburgh, and machines are likewise being sold at the plants at Buffalo and Hazleton, Pa. This is preparatory, it is assumed, to the purchase of considerable new equipment. The McCabe & Shearan Machinery Corporation, 50 Church Street, New York, has had charge of the selling of tools at the Epping-Carpenter plant. The Industrial Plants Corporation, 25 Church Street, New York, has been retained to dispose of surplus equipment of the Hyatt Roller Bearing Co., Harrison, N. J.

Activity in both electric overhead and locomotive cranes continues good, although the number of inquiries and orders reported is not unusually large. Business in hand power cranes is still quiet. In electric hoists one large hoist builder reports that January sales were the largest of any month in the past two years. Among current inquiries is one from

the Phoenix Utility Co., 71 Broadway, New York, calling for bids on a 65-ton, 45-ft. 6-in. span gantry crane with 25-ft. cantilever and a 60-ton, 44-ft. 6-in. span, 4-motor overhead traveling crane. The General Electric Co. is in the market for a 2-ton, 18-ft. 4-in. span, 2-motor type, overhead traveling crane for its Pittsfield shops. Cranes for the Anaconda Copper Mining Co., 25 Broad Street, New York, the Columbia Granite Co., Westerley, R. I., and Selbach & Meyers, West New York, N. J., are still pending.

Among recent purchases are:

Great Northern Paper Co., Anson, Me., a 25-ton, 31-ft. 11-in. span, 3-motor, overhead traveling crane from the Milwaukee Electric Crane & Mfg. Co.;

Decarie Incinerator Co., Cincinnati, a 3-ton, 21-ft. 5-in. span crane equipped with two cage operated grab bucket hoists and single I-beam track and switches from the Shepard Electric Crane & Hoist Co., for an incinerating plant being erected for the city of New York;

Norfolk & Western Railroad, Roanoke, Va., an 80-ton, 62-ft. span overhead travelling crane from the Niles-Bement-Pond Co.;

M. W. Kellogg Co., Jersey City, N. J., a 15-ton crane, duplicating one purchased from the same builder about one year ago, from the Niles-Bement-Pond Co.;

Phoenix Utility Co., 71 Broadway, New York, a 60-ton, overhead traveling crane for Cape Fear, N. C., from the Whiting Corporation;

Darling Valve & Mfg. Co., Williamsport, Pa., a 10-ton, 27-span, 3-motor, overhead traveling crane from the Shepard Electric Crane & Hoist Co.;

Western Asphalt Paving Co., a 40-ton, 60-ft. boom locomotive crane, equipped for bucket handling from the Industrial Works;

John F. Casey Co., Oliver Building, Pittsburgh, a 25-ton, 50-ft. boom locomotive crane with 10-ft. extension to boom and auxiliary drum for bucket operation, from the Industrial Works.

Robert P. Kehoe, Inc., 7 East Forty-second Street, New

York, machinery dealer, has inquiries out for a 100-ton wrecking crane, complete with auxiliary equipment; also for a 100-kw. engine-generator set and one belt-driven air compressor with capacity of 1500 cu. ft. per min. at 40 lb. pressure.

A manual training department will be installed in the proposed high school to be erected at Newburgh, N. Y., estimated to cost \$150,000, for which an architect will soon be selected.

Fire, originating in the machine repair shop at the works of the Fort Plain Motor Co., River Street, Fort Plain, N. Y., on Jan. 30, caused a loss estimated at \$40,000. It is planned to rebuild.

The International Paper Co., 30 Broad Street, New York, is arranging for the operation of a new hydroelectric generating plant at Sherman Island, N. Y., with initial capacity of 25,000 kw.

The Dictaphone Corporation, Gotham Bank Building, New York, recently organized with a capital of \$2,000,000, has acquired the dictaphone branch of the Columbia Graphophone Co., 120 West Twentieth Street, including a portion of the plant at Bridgeport, Conn., for \$1,000,000. The new organization will continue the manufacture of dictaphone instruments and parts and proposes to extend production facilities. Richard H. Swartout is chairman of the board, and C. K. Woodbridge, formerly head of this branch of the business of the Columbia company, president.

A two-story service and repair building, 100 x 100 ft., to cost \$75,000, for company motor trucks, will be erected at 1021-27 Avenue A by the Peter Doelger Brewing Co., 407 East Fifty-fifth Street, New York. George Dress, 116 West Thirty-ninth Street, is architect.

The Foley-Chevrolet Sales Co., 957 Broad Street, Newark, N. J., local representative for the Chevrolet automobile, has leased the building at 37-39 William Street, totaling 25,000 sq. ft., and will equip it as a machine repair shop and service works.

A manual training department will be installed in the high school to be erected at Fultonville, N. Y., to cost approximately \$125,000.

The Transit Commission, 49 Lafayette Street, New York, has received a low bid from the McClintic-Marshall Co., 50 Church Street, at \$293,888, for a third addition to the repair shops of the Interborough Rapid Transit Co., Lenox Avenue and 148th Street. Equipment purchases will be made later. George McAneny is chairman.

The Fulton Auto Service Co., 205 Front Street, New York, has leased the entire building at 84 West Street, for a new machine and repair works.

The Ingram-Richardson Co., Beaver Falls, Pa., manufacturer of enameled steel signs, will build a new one-story plant, 180 x 325 ft., at Bayonne, N. J., to cost in excess of \$75,000. The A. M. Allen Co., Euclid Avenue, Cleveland, is architect.

A manual training department will be installed in the new high school to be erected at Broad and Church Streets, Matawan, N. J., estimated to cost \$100,000. J. N. Pierson & Sons, 175 Smith Street, Perth Amboy, N. J., are architects.

The Westinghouse Lamp Co., 165 Broadway, New York, with plant at Bloomfield, N. J., has acquired property at Belleville, N. J., for its new plant to manufacture brass bases for incandescent lamps, estimated to cost \$500,000, with machinery. Stone & Webster, Inc., 147 Milk Street, Boston, is architect and engineer.

The Standard Oil Co. of New Jersey, 26 Broadway, New York, has plans for an addition to its refinery, 125 x 200 ft., at Bayway, N. J., estimated to cost \$500,000, with machinery.

The City Council, Gloucester City, N. J., will receive bids until Feb. 16 for pumping and filtration equipment and other apparatus for a new 3,000,000 filtration plant at the municipal waterworks. Remington & Vosbury, 601 Market Street, Camden, N. J., are engineers.

The Stanwood Rubber Co., Newark Avenue, Elizabeth, N. J., recently organized, will install additional machinery for the production of cord tires. S. P. Woodard is president, and Manning Stires, vice-president.

Clarence Dunn, Newark, N. J., has leased the one-story building at 17 Hackett Street for a new machine shop and general repair works.

The Battery Service Co., 36 Branford Place, Newark, N. J., has leased a floor in the building at 222-26 Halsey Street, 75 x 165 ft., for a new storage battery equipment and repair works.

The Newman Commercial Body Corporation, New York, has been chartered under State laws with capital of \$25,000, to operate a plant for the manufacture of automobile bodies at 1745 First Avenue, succeeding the former company of this name. S. and A. Newman head the company.

## New England

Boston, Feb. 5.

**R**ESULTS obtained by New England machine tool interests in January varied greatly. Some selling houses did almost nothing, while the most active did 60 per cent of a normal business. Net profits in all instances were small. February is expected to be a more profitable month even if fewer tools are sold, due to generally higher prices for equipment. January began with going business confined very largely to used machinery but ended with new tools moving in much greater proportion.

Purchases by textile machinery makers were the outstanding feature of the market the past week. One company bought six automatic lathes, three 36-in. planers, 16 bench drilling machines and single tools, and has other equipment under consideration. Another purchased two automatic tapping machines, an automatic centering machine and less important tools, and has inquiries out on several more or less special equipment. A third company did not actually place orders, but has several machines under consideration. Sales to other than textile machinery interests included a 2-in. double bolt cutter to a Maine manufacturer, a used wheel lathe to a Massachusetts street railroad, and two 16-ft. and one 12-ft. squaring shear to three different concerns. One dealer reports the sale of 17 machine tools, practically all new, including milling machines, planers, lathes, horizontal boring equipment and two-spindle drills. Used tool dealers generally did not do much.

New prospects which developed included two 10-ton cranes from a carrier, a 42-in. lathe from a Worcester machinery maker, a used 400-ton wheel press for New York interests, and several small lathes for a maker of electrical equipment. The New Britain, Conn., school board voted to spend \$700 for equipment.

A maker of automatic lathes has advanced prices on some sizes approximately 10 per cent. Several items entering into machine shop costs have advanced in price. Hugit belt dressing is up 5c. to 45c. a stick; drop forged C clamps are 10 per cent discount, contrasted with 20 per cent heretofore; lathe dogs are 10 per cent discount, against 20 per cent previously; certain supply houses are quoting straight shank drills at 60 per cent discount, and others 60 and 10 per cent; thumb nuts and screws are quoted list, contrasted with 10 per cent discount a week back; eye bolts are 30 per cent discount, heretofore 40 per cent; Coes wrenches, which were 50 per cent discount, are now 40 and 10 per cent; while drop forged wrenches, formerly 40 per cent, are now 25 per cent discount.

The Westinghouse Electric & Mfg. Co., Pittsburgh, has established a purchasing department at its East Springfield, Mass., plant. Practically everything but machine tools will be purchased here. J. W. Houston is in charge of the department.

Bids closed last week for a one-story, 76 x 100 ft. heat treating unit to be erected by the Moore Drop Forging Co., Springfield, Mass.

Plans will be ready in the spring for figuring on a two-story, 36 x 800 ft. unit to be erected by the Brass City Machine & Tool Works, 29 Pearl Street, Waterbury, Conn.

Manual training shops will be installed in a proposed \$400,000 high school to be erected this year in Auburn, Me. Plans are being drawn, and bids will be asked in the spring. H. H. Randall is superintendent of schools.

The Acme Machinery & Equipment Co., Newington, Conn., contemplates the erection of a one-story, 100 x 225 ft. combined manufacturing, office and storage plant. Martin J. Pearson is manager.

Additional land has been purchased by the Hoague Sprague Corporation, 528 Broad Street, Lynn, Mass., box manufacturer, on which a three-story addition will be erected.

The plant of the Locomobile Co. of America, Bridgeport, Conn., will close for a month for changes in arrangement of old and new equipment. Approximately \$300,000 is being expended in construction and new machinery. About 1200 will be temporarily affected by the shutdown.

Edward Miller, president, and John L. Billard, a director, owning a controlling interest in Edward Miller & Co., Meriden, Conn., lighting and heating products, employing approximately 1000, have sold their interests to Rex J. Cole, president Duplexite Corporation, New York. According to present plans, the minority stockholders will receive \$35 a share for their stock, or \$10 better than par. The Duplexite lighting fixture has been manufactured by the Miller company for some time, but has been sold and distributed through the General Electric Co. by special license. The sales plan, it is understood, will be carried on as heretofore.

Plans have been announced by the Connecticut Light &



Power Co. for the construction of a \$3,000,000 electric generating plant at Devon, with a capacity of 200,000 hp. The station will be steam-operated and will consume about 1500 tons of coal daily.

A one-story power plant will be constructed at the new hat factory to be erected on Van Zandt Street, Norwalk, Conn., by the Crofut & Knapp Co., South Norwalk, estimated to cost \$750,000. Bids will soon be asked by Fletcher-Thompson, Inc., Bridgeport, Conn., architect.

A vocational department will be installed in the new high school to be erected on West Elm Street, Greenwich, Conn., estimated to cost \$800,000. Guilbert & Betelle, 546 Broad Street, Newark, N. J., are architects.

The Edison Electric Illuminating Co., 70 State Street, Boston, has acquired property at 80-84 Warrenton Street, extending to 64-68 Carver Street, as a site for a new power house.

The Fly-Lock Knife Co., Bridgeport, Conn., recently organized, has leased a building formerly occupied by the Challenge Cutlery Co., for a new plant to manufacture a patented press-button pocket knife. P. L. Van Alstyne is head.

A manual training department will be installed in the three-story high school to be built at Turners Falls, Mass., estimated to cost \$250,000. The Frank Irving Cooper Corporation, 172 Tremont Street, Boston, is architect.

The City Gas & Electric Department, Holyoke, Mass., has leased a two-story building, 57 x 100 ft., to be erected on Walnut Street, for the establishment of a service and machine repair works for municipal motor trucks and automobiles, estimated to cost \$80,000.

A manual training department will be installed in the three-story junior high school to be erected at Williamstown, Mass., estimated to cost \$300,000. The Frank Irving Cooper Corporation, 172 Tremont Street, Boston, is architect.

The Standard Mattress Co., 71 North Street, Hartford, Conn., is having plans prepared by Golden-Storrs & Co., architects, 118 Asylum Street, for a new four-story 40 x 50 ft. brick and reinforced concrete factory. Machinery will be purchased and a conveyor system will be required also.

The Patton-MacGuyer Co., metal goods and jewelry manufacturer, 31 Mathewson Street, Providence, has awarded contract to the C. I. Bigney Construction Co., 357 Westminster Street, for a new one-story and basement factory 50 x 120 ft., at Manucentre, Providence. New equipment will be installed.

## Philadelphia

PHILADELPHIA, Feb. 5.

TENTATIVE plans are under consideration by the Ford Motor Co., Highland Park, Mich., for the purchase of a portion of the Hog Island shipyard, Philadelphia, from the Government, totaling about 50 acres, as a site for an assembling plant. Negotiations have been opened with the United States Shipping Board.

The Guy A. Willey Motor Co., Broad and Vine Streets, Philadelphia, has leased a four-story and basement building, 120 x 220 ft., to be erected at 3020-32 Market Street, for a new service and repair works.

Frank C. Roberts & Co., Real Estate Trust Building, Philadelphia, engineers, have inquiries out for lathes.

The Foreign Trade Bureau, Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Tokio for American wood-working machinery and electrical equipment.

Fire, Jan. 28, destroyed the automobile service and repair building of F. G. Vogt & Sons, Inc., Thirtieth and Race Streets, Philadelphia, meat packer, at 126 South Thirty-sixth Street, with loss estimated at \$50,000.

Motors, controllers, conveying and other equipment will be installed in the three and four-story printing plant, 85 x 150 ft., to be erected by the Board of Education, Nineteenth and Chestnut Streets, Philadelphia, estimated to cost \$250,000.

The Spicer Mfg. Co., Pottstown, Pa., manufacturer of universal joints, will build an addition to its plant.

A manual training department will be installed in the new high school to be erected at Waynesburg, Pa., estimated to cost \$100,000.

Fire, Jan. 28, destroyed the electrically-operated coal breaker of the George F. Lee Coal Co., Avondale, Pa., with loss estimated at \$250,000. It is planned to rebuild.

The Reading Hardware Co., Reading, Pa., has awarded contract to the John W. Ferguson Co., Paterson, N. J., for a seven-story addition, with foundry and machine shop, estimated to cost \$800,000, including machinery.

The Lancaster Steel Products Corporation, Lancaster, Pa.,

is planning for the installation of a number of 2-ton traveling cranes.

The Pennsylvania Equipment Co., Norwood Station, Pa., machinery dealer, has inquiries out for a 2½-yard steam shovel.

A manual training department will be installed in the new high school to be erected at Green Tree, Pa., by the Willis-town Township School District Board, to cost in excess of \$90,000. Henry L. Reinhold, Jr., 1513 Walnut Street, Philadelphia, is architect.

A manual training department will be installed in the new junior high school to be erected at Easton, Pa., estimated to cost \$150,000. A new senior high school, with similar department, is also planned. Snyder & Michler, Easton, are architects.

The American Bosch Magneto Corporation, Springfield, Mass., has acquired the plant of the Reading Standard Motorcycle Co., State Street, Reading, Pa., from the receiver for \$30,000, and is said to be planning the establishment of a branch plant at this location. The equipment at the factory was secured by the Cleveland Motorcycle Mfg. Co., Platt Avenue, Cleveland, for a like sum.

L. F. Seyfert's Sons, Inc., 437 North Third Street, Philadelphia, machinery merchant, has inquiries out for equipment for a woodworking plant.

Plans are being drawn for a one-story paper mill, 35 x 170 ft., for the Conewago Felt & Paper Co., York Haven, Pa., recently organized with a capital of \$300,000. E. E. Brunner, president of the York Haven State Bank, heads the company. Hamme & Witman, City Bank Building, York, Pa., are architects.

The Coudersport & Port Allegheny Railroad Co., Coudersport, Pa., has preliminary plans for rebuilding its engine house and locomotive repair shop, destroyed by fire Jan. 27 with loss estimated at \$75,000.

A pumping plant, mechanical blower system, furnaces, etc., will be installed at the municipal incinerating plant to be built at Allentown, Pa., for which bids on revised plans will be called at once. Harry F. Bascom is city engineer.

A. Ziegler, 916 Norton Street, Scranton, Pa., is planning to equip a plant to manufacture coin-operated vending machines and parts.

## Baltimore

BALTIMORE, Feb. 5.

REORGANIZATION plans are being perfected by the Poole Engineering & Machine Co., Woodbury, Baltimore, covering the dissolution of the holding company, the Poole Engineering Co. of Delaware, and the issuance of additional stock, of which 50,000 shares will be turned over to the Franklin Mfg. & Supply Co., Baltimore, for an interest in the business to manufacture railroad "booster" devices and equipment. The Franklin company controls the patents on the apparatus and the Poole company will arrange its plant to manufacture at least two-thirds of all such equipment for the next five years. The bulk of production at the Woodbury works will be for this apparatus. S. Proctor Brady heads the company.

The C. H. Turner Foundry Co., Inc., Stateville, N. C., recently organized with capital of \$100,000, has awarded contract to the Maryland Metal Building Co., Race and McComas Streets, Baltimore, for a one-story foundry, 70 x 135 ft. C. H. Turner is president, and D. C. Ritchie, secretary and treasurer.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Feb. 20 for 56,600 lb. of cast steel chain, schedule 484.

The Autovac Co., Inc., Salisbury, N. C., manufacturer of automobile equipment and parts, is contemplating the erection of a plant, estimated to cost \$75,000 with equipment. H. H. Rouzer is president.

The Atlantic Coast Line Railway Co., Wilmington, N. C., has tentative plans for rebuilding the portion of its repair shops destroyed by fire Jan. 19 with loss estimated at \$125,000, including equipment.

The Berkeley Machine Works & Foundry Co., Norfolk, Va., is arranging for additions for large capacity increase. The company formerly was known as the Beckeley Machine Works, Inc. Samuel G. Jones is president.

The Hiddenite Crushed Stone Co., Inc., Hiddenite, N. C., is planning for the installation of molds and other equipment to manufacture concrete pipe, 12 to 48 in. in diameter, steel reinforced, and other specialties.

The Hackley-Morrison Co., Inc., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a 1250-kva. condensing type turbo-generator; also for a 759-kva. alternator, direct-connected to automatic steam engine; and for a

100-hp. feed water heater, and other power plant equipment.

A manual training department will be installed in the new high school to be erected at Canton, Ga., estimated to cost \$70,000. W. J. J. Chase, Atlanta, Ga., is architect.

The Drexel Furniture Co., Morganton, N. C., will commence the erection of a two-story addition, 75 x 300 ft., estimated to cost \$65,000 including equipment.

The Laurens Cold Storage Co., Laurens, S. C., recently organized, is arranging for a new ice and cold storage plant to cost approximately \$70,000. Charles F. Fleming is president and treasurer.

The Chickamauga Quarry & Construction Co., Graysville, Ga., is contemplating the construction of a new stone crushing and sorting plant with capacity of 500 tons a day. A list of machinery required will soon be arranged. Headquarters are at Chattanooga, Tenn.; W. S. Holmes is general manager.

Fire, Jan. 23, destroyed a portion of the plant of the Lee Veneer Co., Lexington, N. C., with loss estimated at \$45,000, including machinery. It is planned to rebuild.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, will build a new power house and electric switching station at Kloman Street and the Western Maryland Railroad, 48 x 145 ft., to cost \$105,000.

The Roanoke Tire & Rubber Co., Roanoke, Va., is planning the erection of a new three-story plant to manufacture automobile tires and other rubber products. Charles H. Kieffer is general manager.

The Carolina Steel & Iron Co., Greensboro, N. C., is planning for the installation of a 10-ton electric traveling crane, 50 ft. span.

A vocational department will be installed in the new two-story high school to be erected at Columbus, Ga., estimated to cost \$480,000. R. B. Daniel is superintendent of the Board of Education in charge.

A power house will be built in connection with a new textile mill addition at the plant of the Mays Mill Co., Cramerton, N. C., estimated to cost close to \$1,000,000. J. E. Sirrine & Co., Greenville, S. C., are engineers.

A power plant will be erected in connection with the new textile mill to be erected by L. D. Robinson, Wadesboro, N. C., and associates, estimated to cost \$400,000. A company is being organized to operate the plant.

The Ryan Engineering Co., Arcade Building, Columbia, S. C., is in the market for an engine-generator set, about 150 kva., and other electrical apparatus.

J. S. Hardy, Lula, Ga., is inquiring for a new hydraulic ram and kindred equipment.

A traveling crane will be installed by the Port Utilities Commission, Charleston, S. C., in connection with the construction of a proposed pier for fertilizer handling on Town Creek, to cost about \$1,000,000. Conveying machinery will also be required.

## Pittsburgh

PITTSBURGH, Feb. 5.

**B**USINESS in machine tools in January shows up strongly. It was the experience of one local house that its inquiries for the month averaged five per day and its sales one per day. This was paralleled by another house. Generally, it was a good month and the trade is encouraged to look for even better things this month. The most favorable development with dealers is that they have been able to dispose of a good many tools, some of which had been carried for a long time and were classed as "shop keepers." January also was a good month in used machinery, due to many buyers turning to this class of equipment because prices fitted expenditures more closely than those of new tools. The latter, however, made a good showing in the sales and it is stated that full half of the business closed was developed in January. Interest in tools still is high, judged by the number of inquiries still coming out.

No important price changes are noted, but it is reported that the smaller buyers are tightening in their price ideas on practically all tools except lathes and milling machines.

Pending business in cranes and other heavy machinery is assuming very large proportions, and if half of the inquiries now before the trade materializes into orders makers are assured of a good year. One crane company representative stated that inquiries are greater than at any time since the war. The iron and steel industry has so much business in sight that some big orders are expected. It is known that

the Steel Corporation has some extensive plant extensions and improvements mapped out for Pittsburgh district works and prices against mill equipment and cranes have gone in for estimating purposes. Definite details, however, are not yet available. The corporation recently appropriated close to \$1,000,000 for rebuilding one of its docks at Conneaut, Ohio, contract for which has been placed with the Dravo Contracting Co., Pittsburgh, and this is expected to be followed by a revival of the inquiry for equipment of this dock, originally put out a couple of years ago. This is a Bessemer & Lake Erie Railroad project. Independent steel companies also are doing considerable figuring on new equipment. It is realized that costs cannot be reduced so long as labor remains short and the only alternative is the installation of new and labor saving machinery.

The Dravo Contracting Co., Pittsburgh, is expected to close soon for one 15-ton crane, with 72-ft. span and one 10-ton double trolley crane of the same span. The Superior Steel Corporation, Pittsburgh, is in the market for a 10-ton crane. The J. A. Fay & Egan Co., Cincinnati, recently closed for five Pawling & Harnischfeger cranes of 3 and 5-ton capacity.

Fire, Jan. 26, destroyed a portion of the plant of the Pittsburgh Wire Rope Co., Verona, Pittsburgh, with loss estimated at \$250,000, including equipment. It is planned to rebuild.

A manual training department will be installed in the two-story and basement high school, 70 x 250 ft., to be erected at Ambridge, Pa., estimated to cost \$400,000. W. Ward Williams, 309 Fourth Avenue, Pittsburgh, is architect.

The Ward Baking Co., 3100 Liberty Avenue, Pittsburgh, will erect an electrically-operated baking plant at West Park and Ridge Avenues, estimated to cost \$1,000,000, including equipment.

The Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has purchased the foundry and machine shop of Yost Brothers, Creighton, Pa., adjoining its local works, to be used in connection with extensions estimated to cost \$2,000,000, with machinery.

A manual training department will be installed in the two-story senior and junior high school to be erected at Trafford, Pa., estimated to cost \$125,000, for which bids will be received on a general contract until Feb. 19. William H. King, Jr., Ferguson Building, Pittsburgh, is architect.

Bertrand P. Tracy, 901 Pennsylvania Avenue, Pittsburgh, will commence the erection of a one-story plant, 80 x 200 ft., at Page and Fulton Streets, for the manufacture of mine equipment and supplies, estimated to cost \$55,000.

Vocational departments will be installed in the new two-story Douglas high school to be erected at Huntington, W. Va., to cost \$125,000; a similar department will be installed in the two-story Lincoln junior high school, estimated to cost \$160,000. John D. Graham, superintendent of the Board of Education, is in charge.

The Common Council, Zellenople, Pa., will install centrifugal pumping machinery and other motor-driven equipment in connection with its water filtration plant to cost \$150,000. Hudson & Myron, Wabash Building, Pittsburgh, are engineers.

The Western Electric Co., 195 Broadway, New York, and Rodgers Avenue, Pittsburgh, has leased a five-story and basement building, 60 x 150 ft., to be erected on First Avenue, Pittsburgh, at a cost of \$150,000, for a new factory branch. F. G. Ross, 309 Fourth Avenue, is engineer.

The Standard Motor Car Co. has been organized under Delaware laws to take over and operate the company of the same name, with plant at Butler, Pa., for the manufacture of automobiles and parts. The Standard Steel Car Co., Frick Building, Pittsburgh, formerly the parent organization, has disposed of its entire automotive interests to the new corporation. Executive headquarters will be at the Butler works. Plans are under way for factory facilities for the manufacture of a four-cylinder car, in addition to the present eight-cylinder. D. C. McCord is president.

The Monongah Fuel Co., Monongah, W. Va., will install a motor-generator set and other equipment at its plant. David Victor is president and general manager.

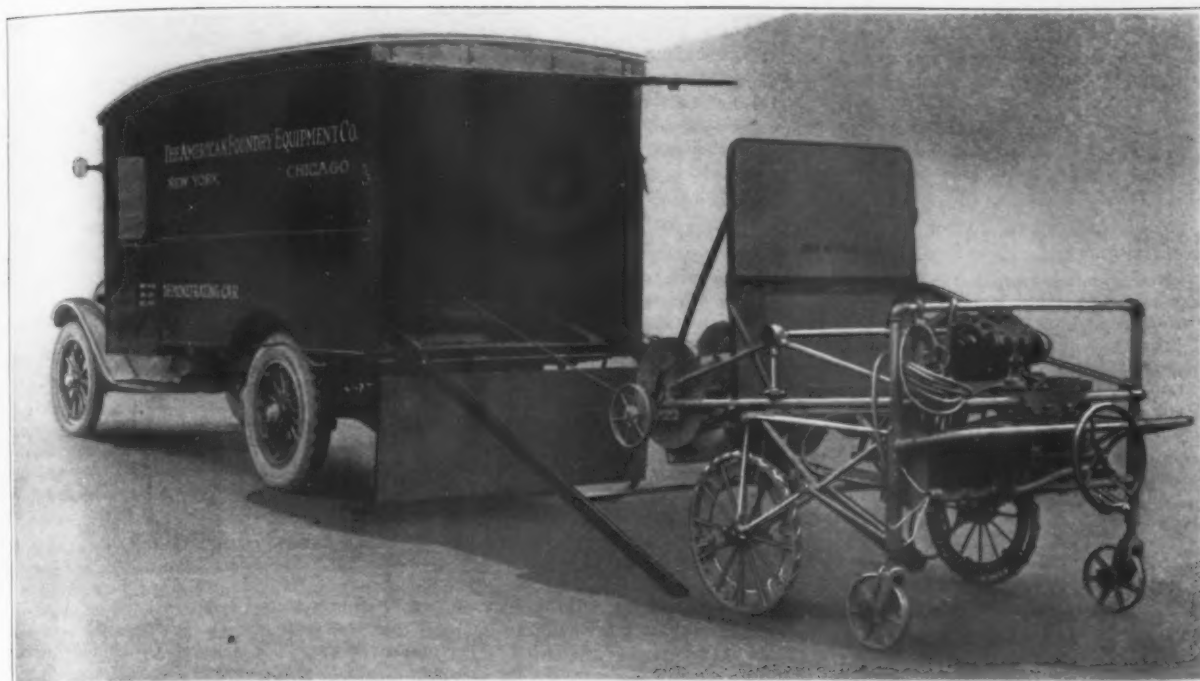
The Cord Tire Co., Chester, W. Va., will have plans prepared for a new plant unit to increase the capacity from 650 to 3000 tires per day.

The Guyan Machine Shops, Logan, W. Va., machinery merchants, have inquiries out for a stiff leg derrick, or steel derrick, without hoists; also for a press for the production of automobile tires, and a quantity of structural steel shapes.

The Universal Steel Co., Bridgeville, Pa., has awarded contract to the Pittsburgh Bridge & Iron Works, Bessemer Building, Pittsburgh, for a one-story addition, 50 x 150 ft.

The Radio Glass Co., Lumberport, W. Va., recently organized, has acquired property adjoining the plant of the Mound City Glass Co., for a new mechanical etching works.





A specially built commercial body on a Dodge chassis is used to transport this sand cutting machine about the country for demonstration purposes. The machine is unloaded at the foundry door, the power cable plugged in on the electric circuit, and a demonstration of the use and economy of the machine given. Schedules are prepared in advance of the trip. This method of demonstrating machinery while not without precedent is unusual and effective. The equipment illustrated is that of the American Foundry Equipment Co., 366 Madison Avenue, New York.

estimated to cost \$35,000, with machinery. V. L. Hornor and E. P. Boggess head the company.

The Linde Air Products Co., 30 East Forty-second Street, New York, will commence the erection of a new oxygen plant on Westfall Street, Pittsburgh, consisting of a main one and two-story building, 100 x 160 ft., and two smaller structures.

The Liberty Glass Co., Clarksburg, W. Va., will install machinery for the conversion of its plant from a hand-operated to machine-operated works, at the same time doubling the present capacity. The work will cost more than \$55,000.

The A. C. Love Co., Huntington, W. Va., machinery dealer, is in the market for a 12-in. molding machine; also for a hand-operated electric propelled freight elevator, 3000 lb. capacity.

## Buffalo

BUFFALO, Feb. 5.

**P**LANs are being considered by the Water Valley Foundry Co., Water Valley, N. Y., for rebuilding its foundry destroyed by fire Jan. 25.

The Watkins Commercial Body Co., 666-72 Genesee Street, Buffalo, is planning for the erection of a two-story addition, 30 x 150 ft.

The Vacuum Oil Co., Exchange Building, Rochester, N. Y., will build an addition to its oil refinery at the foot of East Twenty-second Street, Bayonne, N. J., to cost \$105,000.

Officials of Bartlett & Co., 34 Susquehanna Street, Binghamton, N. Y., operating a lumber plant, have organized a new company of the same name, capitalized at \$350,000, to manufacture contractors' and engineering equipment. Sidney T. Clark heads the new organization.

The Standard Shade Roller Co., Ogdensburg, N. Y., is planning for the erection of an addition to cost \$50,000, including machinery. H. M. Wheaton is general manager.

A vocational department will be installed in the new high school to be erected on Delaware Road, Kenmore, N. Y., estimated to cost \$500,000.

Fire, Jan. 25, destroyed a portion of the works of the Keybolt Appliance Co., Orchard Park, Erie County, N. Y., with loss approximating \$17,000.

The Crooks & McLean Co., 225 State Street, Carthage, N. Y., operating a marble works, plans the installation of three new geared chain hoists, two of 5-ton capacity, and one 2½-ton.

The Syra-Cord Rubber Co., Syracuse, N. Y., is being organized with a capital of \$1,000,000 and 50,000 shares of common stock, no par value, to take over the plant and

business of the Syracuse Rubber Co., manufacturer of automobile tires, etc. A bond issue of \$300,000 is being arranged of which about \$150,000 will be used for proposed extensions and improvements.

A manual training department will be installed in the three-story high school to be erected on Prospect Street, Attica, N. Y., for which bids on a general contract will be received until Feb. 26. It will cost \$250,000. Miller & McNeil, 80 West Genesee Street, Buffalo, are architects.

The Geneva Vacuum Bottle Co., Geneva, N. Y., plans the installation of machinery in a local building. R. S. Ellinwood is head.

The Northern New York Utilities, Inc., 58 Public Square, Watertown, N. Y., will build a new retort house at its power plant on Engine Street, to cost \$250,000 with machinery. S. D. Gilbert is general manager.

The Jiffy Auto Chain Corporation, 88 Main Street, Watertown, N. Y., will install machinery for the manufacture of automobile steel skid chains. W. W. Chamberlain is head.

The car shops of the Erie Railroad, Buffalo, operated for more than a year by the Seminole Construction Co., have been returned to the active control of the railroad company.

Herbert Morris, Inc., Buffalo, is in the market for several used tools including a Landis 1½ in. or 1½ in. single head threading machine.

## Cleveland

CLEVELAND, Feb. 5.

**M**ACHINE tool business continues good and the volume of inquiry has increased. The bulk of orders placed the past week came from the automobile field, either from car builders or manufacturers of parts. Considerable equipment was purchased in Toledo by the Electric Auto Lite Corporation, Chevrolet Motor Co. and the Owens Bottle Machine Co. The Ferro Machine & Foundry Co., Cleveland, is inquiring for 15 to 20 lathes for turning Ford pistons and two Akron rubber companies have inquiries out for 10 machines aggregating about \$20,000 for making molds. Another Ohio manufacturer has sent out a tentative inquiry for 20 or more machines, several being large tools. While the volume of business in fair-sized lots has increased, orders for single tools or small lots still predominate. A local turret lathe manufacturer reports a very good business in January, although the largest order was for only four machines.

Inquiry for steel plant equipment shows improvement, and some coke oven requirements which have been pending are expected to be placed shortly. The Edison Co., Boston, is inquiring for belt-conveying bridges for handling coal for a new power plant. The belt conveyor will take the place of the usual bridge trolley.

The Toledo Machine & Tool Co., Toledo, Ohio, advanced prices 10 per cent Feb. 1 on its line of presses.

The Sommer-Adams Co., Cleveland, recently incorporated, has taken over the line of milling cutters formerly made by the Cleveland Milling Machine Co. and later by the Shields Cutter Co., and the line of horizontal mills placed on the market several years ago by the Cleveland Machine Tool Works, which was later absorbed by the Cleveland Milling Machine Co. The Sommer-Adams Co. will also manufacture special tools, jigs and fixtures. It has the building formerly occupied by the Cleveland Milling Machine Co. While the organization has not yet been completed, it is stated that L. A. Sommer will be vice-president and general manager, and F. H. Adams secretary and treasurer. N. S. Squire, formerly with the National Tool Co., Cleveland, is sales manager.

J. B. Clow & Sons, Newcomerstown, Ohio, will make extensions to their foundry, as well as some rearrangement, and have placed an order with the Whiting Corporation for two 84-in. cupolas and mechanical charging cars and also for a 7½-ton electric traveling crane.

The Timken Roller Bearing Co., Canton Ohio, has placed an order with the Morgan Engineering Co., Alliance, Ohio, for a 15-ton electric traveling crane with 10-ton auxiliary and a 10-ton crane with a 5-ton auxiliary.

The plant of Hadfield-Penfield Steel Co., Bucyrus, Ohio, was recently damaged by fire but little loss was caused other than the burning of the roof of the foundry. The company states that damage to the equipment was very slight and it will not be in the market for any new machinery.

The Par-Brook Mfg. Co., 4600 Brook Park Road, Cleveland, manufacturer of metal doors, stoves and sheet metal stampings, will enlarge its plant by a one-story addition, 160 x 180 ft. It will probably need some additional machinery later.

The Cleveland Motorcycle Mfg. Co., 7209 Platt Avenue, Cleveland, has purchased the Reading Standard Motorcycle Co., Reading, Pa., and will move the equipment to its Cleveland plant.

The Superior Metal Products Co., Elyria, Ohio, will enlarge its plant by the erection of a one-story addition 55 x 110 ft.

The Rhoda Body & Mfg. Co., Lima, Ohio, has placed contract for the erection of an addition.

The Toledo Bottle Cap Co., Toledo, Ohio, has purchased a factory, 50 x 220 ft., on Miami Street, and plans an extension.

The Carbocite Co., Alliance, Ohio, has been incorporated with a capital stock of \$50,000 to manufacture special machinery for the carbonizing of coal at mines. A. J. Reeves and G. H. Newton, both connected with the Reeves Brothers Co., Alliance, are among the incorporators.

The new building to be erected by the Grinnell Co., Warren, Ohio, will be four stories, and will be used for manufacturing fittings and for warehouse purposes. It is understood that the company will also build a galvanizing plant.

## Cincinnati

CINCINNATI, Feb. 5.

**J**ANUARY with machine-tool manufacturers was the best month experienced since the depression set in in 1920. There were no large purchases, but orders came in steadily for one and two machines at a time. The past week was not quite so active, but no significance is attached to the lull. There is a large number of inquiries out and the outlook is for good business for some time to come. The Buick Motor Car Co., Flint, Mich., bought approximately \$50,000 worth of tools, represented by 10 machines, six automatics and four special production machines. The Continental Motors Co. also was a purchaser, taking two machines, and is on the point of buying a sizable list. Other buyers during the week included the Hooven, Owens & Rentschler Co., the Herring-Hall-Marvin Safe Co., both of Hamilton, Ohio, and the Newport Rolling Mill Co., Newport, Ky. An Indianapolis manufacturer also

bought a number of tools, including one heavy duty engine lathe.

The largest inquiry in the local market is from the Louisville and Nashville Railroad, which is asking bids on about a dozen miscellaneous tools. The road recently purchased six machines. The Big Four Railroad, which some time ago sent out an inquiry for 10 tools, has added a number to the list and will likely be a purchaser for the next few weeks, as its requirements are said to be heavy. The Ford Motor Co. is reported to be quietly negotiating for a number of tools for its main plant and several of its subsidiaries.

The labor problem in this district is acute, and indications point to its growing more so when the outdoor building season sets in.

The Williamson Heater Co., Cincinnati, whose factory was completely gutted by fire several weeks ago, has not yet completed plans for rebuilding. The foundry department, which escaped the flames and which has been closed since the fire, resumed operations today.

The Hydraulic Press Mfg. Co., Mt. Gilead, Ohio, has increased its capitalization from \$200,000 to \$1,200,000 and the company will shortly issue \$440,000 worth of 7 per cent preferred stock. It manufactures hydraulic presses, pumps, valves, accumulators and intensifiers, as well as fruit juice presses. The company now operates machine, pattern and erecting shops, and gray iron and brass foundries. It is contemplating extensions to all these departments and the installation of machine tools and wood-working equipment. A new office building is also contemplated. F. B. McMillan is vice-president and general manager.

The Alco Foundry & Machine Co.'s plant at Hamden, Ohio, destroyed by fire early in January, will be rebuilt. Plans will shortly be completed and contract awarded for the new building, which will be considerably larger than the one destroyed.

The main office of the Tennessee Copper & Chemical Corporation, which is building a plant near Cincinnati, is Room 1824, 61 Broadway, New York.

## Detroit

DETROIT, Feb. 5.

**A**VOCATIONAL department will be installed in the proposed new high school to be erected at Main and Parsonage Streets, Dowagiac, Mich., estimated to cost \$300,000. Perkins, Fellows & Hamilton, 814 Tower Court, Chicago, are architects.

The Litcher Electric Co., 41-43 Market Avenue, Grand Rapids, Mich., manufacturer of electrical equipment, has awarded a general contract to W. Baker & Son, 1356 Bemis Street, for a three-story and basement plant, 48 x 165 ft., to cost \$150,000 with machinery. C. J. Litcher is head.

The National Can Corporation, Detroit, recently organized with a paid-in capital of \$1,150,000, has acquired the business of the company of the same name at 2566 East Grand Boulevard. Plans are under way for enlargements, including the automobile radiator department. Neil McMillan is president and treasurer, and A. V. Crary, vice-president and general manager.

A one-story machine shop, 32 x 225 ft., will be built by the Velick Scrap Iron & Machinery Co., 5639 Roby Place, Detroit, for which bids are being asked on a general contract.

The Grand Rapids Chair Co., 1661 Monroe Street, N. W., Grand Rapids, Mich., has awarded contract to the Owen Ames & Kimball Co., Pearl Street, for the construction of a five-story addition, 100 x 100 ft., estimated to cost \$75,000.

The Reo Motor Car Co., Lansing, Mich., has plans for a three-story addition to its works, 365 x 577 ft., estimated to cost \$500,000. R. E. Olds is president.

The Paalman Furniture Co., Grand Rapids, Mich., is taking bids for the construction of a three-story addition to cost \$60,000.

The Ford Motor Co., Highland Park, Mich., will take bids at once for a one-story addition at its River Rouge plant for motor car and tractor castings. It has filed plans for its assembling plant on Torrence Avenue, Chicago, with main building one story, 502 x 1363 ft., estimated to cost \$1,200,000, with machinery. Albert Kahn, 1000 Marquette Building, Detroit, is architect for both projects.

The J. W. Murray Mfg. Co., 1975 Clay Street, Detroit, manufacturer of automobile fenders and other sheet metal products, has work under way on a new one-story building, 72 x 125 ft., to cost approximately \$25,000.

Manual training departments will be installed in the two



new high schools to be constructed at Lansing, Mich. J. N. Churchill, Oakland Building, is architect.

Bids for equipment will soon be taken for the hydro-electric power plant, 60 x 140 ft., to be built on the St. Joe River, near Mottville, Mich., by the Michigan Gas & Electric Co., 72 West Adams Street, Chicago, estimated to cost \$100,000. Holland, Ackerman & Holland, 53 West Jackson Boulevard, Chicago, are engineers.

The Cadillac Machinery Co., 452 Lafayette Street, Detroit, is planning for the installation of a vertical boring mill and other equipment.

A manual training department will be installed in the two-story high school to be erected at Bellevue, Mich., 70 x 195 ft., to cost \$100,000, for which new bids on a general contract will soon be taken. C. S. Patterson, Kalamazoo, Mich., is architect.

The Detroit Stove Works has purchased the business of the Art Stove Co., Detroit, and will manufacture Laurel stoves and furnaces, which have been the products of the Art company. The purchaser plans to enlarge the business. Officers of the Detroit Stove Works are: President, W. T. Barbour; vice-president, W. G. Henry; secretary and general manager, John A. Fry.

The Marshall Furnace Co., Marshall, Mich., was almost totally destroyed by fire Feb. 2, entailing a loss of approximately \$200,000. The foundry was the only department not damaged. The plant will be rebuilt as soon as the insurance has been adjusted.

The Fisher Body Corporation, Detroit, will begin the construction of a new plant at Pontiac, Mich., in the near future. It will provide closed bodies for the Oakland Motor Car Co. and will have 300,000 ft. of floor space in the first three units and employ 2500 men. Twenty-six acres have been purchased from the General Motors Corporation, at Baldwin Avenue and the Kennett Road.

## Milwaukee

MILWAUKEE, Feb. 5.

**S**ALES of machine-tools by manufacturers the past week again showed an increase, which while slight, give promise of a steady growth in volume. Dealers report more activity, inquiry showing improvement as shops prepare for changes and enlargements to facilitate increased production. Sales included considerable used machinery. A general survey of the foundry and machine shop industry in this district reveals plans for new construction, alterations and enlargements promising a substantial demand for equipment. Other lines besides automotive industries are now appearing in the machinery market, giving a broad aspect to the outlook, which is considered especially encouraging.

The South Side Malleable Casting Co., Fourteenth and Windlake Avenues, Milwaukee, has let contracts for a new annealing building, 180 x 240 ft., estimated to cost \$100,000 with equipment, now being purchased. The general contractor is Henry A. Kroening, 893 Layton Boulevard, Walter W. Lange is president and general manager.

The Burlington Brass Works, Burlington, Wis., is installing a new  $\frac{3}{4}$ -ton electric furnace of 105-kw. capacity and some miscellaneous equipment, largely polishing machinery. A night shift was put on Feb. 1, increasing the force to 125. Orders from the automotive industries are especially heavy, while the plumbing trade and other lines are placing larger requirements. Jacob Wamnes is works manager.

The Harvey Spring & Forging Co., Racine, Wis., automotive springs and forgings, contemplates the erection of an addition to its works at Seventeenth and Murray Avenues. Definite details will be announced later. E. J. Harvey is president.

The Burlington, Wis., works of the Universal Can Co. has been ordered to increase its 1923 output 50 per cent over that of last year, when 50,000,000 cans were produced. A third line will be put into operation at once and a fourth is to be installed about March 1, while the force is being increased to 150. C. M. Knight is general superintendent.

The Pittsburgh Plate Glass Co., which is completing a \$500,000 paint and varnish factory and research laboratory at Milwaukee for the Patton-Pitcairn Division, has engaged Cahill & Douglas, consulting engineers, 217 West Water Street, local, to design a steam generating plant, 75 x 90 ft., and 50 ft. high, to be equipped with new boilers, engines, generators, automatic stokers, fuel and ash handling machinery and auxiliaries. The cost is estimated at \$135,000. Ludington Patton is vice-president and general manager, in charge of the Milwaukee division.

The Milwaukee Gas Light Co., 182 Wisconsin Street, Milwaukee, let the general contract to H. Schmitt & Son, Inc., 430 Farwell Avenue, for an additional story, 60 x 220 ft., to its repair shop and storage building at 134-138 Erie Street. Some additional machinery will be purchased. R. B. Brown is vice-president and chief engineer.

The Wisconsin Public Service Corporation, 559 Marshall Street, Milwaukee, which is completing an 8000-hp. hydro-electric generating plant at High Falls, on the Peshtigo River, near Pound, Wis., will start work about April 1 on a concrete dam and generating plant of identical size at Cauldron Falls, ten miles north of the High Falls installation. Plans have been completed and purchase of equipment is now under way. Clement C. Smith, Milwaukee, is president.

The Wisconsin Steel & Dock Co., Milwaukee, recently incorporated in Wisconsin with 1000 shares of non-par common stock and \$250,000 preferred stock, has taken over the plant and property of the Milwaukee Marine Repair Co., which originally was built in 1917, for the construction of inland waterway vessels for the Government. It has 1200 ft. of dock forage and 30,000 sq. ft. of floor space. The buildings will be remodeled to handle large repair and reconstruction work on Great Lakes vessels, and a sectional drydock will be constructed. The new company also takes over a large shipyard at Kewaunee, Wis., which is equipped to build steel as well as wood hulls, and accommodates vessels up to 550 ft. F. W. Stevens is secretary and J. J. Cato, vice-president and general manager.

The Pinless Clothesline Mfg. Co., LaCrosse, Wis., has been organized by Vincent A. Roth and W. D. Fackler, who have established a factory at 500 North Fourth Street to manufacture a patented clothesline made from Bessemer steel wire with loops to clinch fabrics, obviating the use of the ordinary pin. Present equipment needs are covered, but enlargement of capacity about March 15 or April 1 is planned.

The Hamilton-Beach Co., Racine, Wis., manufacturer of electrical equipment, has plans by A. L. Flegel, local architect, for a three-story addition, 75 x 385 ft., work on which will start about March 1. The investment in building and additional machinery will be approximately \$240,000. F. J. Osius is general manager.

The Blue Seal Iron Co., Wisconsin Rapids, Wis., has been incorporated with 300 shares of non-par valued common stock by Otto R. Roenius, Oscar E. Uehling and Otto A. Labius, to handle the jobbing department of the foundry division of the American Carbonic Machinery Co. It recently took over the remaining interest in the Grand Rapids Foundry Co., which, besides making castings for refrigerating machinery, did a large jobbing business. The ownership of the new iron company and the refrigerating machinery concern are identical. Enlargement of the casting shop at a cost of about \$50,000 next spring has been decided upon.

The Rhinelander, Wis., Board of Education has engaged Smith, Reynolds & Brandt, architects, Manitowoc, Wis., to prepare plans for a new high school and vocational training institute to cost \$300,000. No date has been set for taking bids. August Carlson is chairman of the building committee.

The Horlick Malted Milk Co., Racine, Wis., is in the market for miscellaneous equipment for garage and service station, 60 x 120 ft., two stories, to accommodate its motor vehicles.

The Invincible Metal Furniture Co., Manitowoc, Wis., which specializes in the production of safe deposit boxes, vaults and filing equipment, will start work Feb. 15 on a two-story brick and steel addition, 90 x 200 ft., to be equipped as a machine shop, shear room, pressing department and general production building. Considerable equipment will be purchased to supplement the present machinery, and additional enameling ovens and auxiliaries also will be installed. A complete plating department has recently been provided. An 11-hr. night shift was added to the force Feb. 1. E. W. Anderson is works manager.

The Globe Sheet Metal & Furnace Works, 567 Third Street, Milwaukee, has incorporated as the Globe Sheet Metal Co., with a capital stock of \$12,000. Joseph Volpert, Max Katz and Isaac Glaser continue as the principal owners and managers. A general line of tin, galvanized and copper products is manufactured. Plans for increased output are being completed.

Fritzsche & Icke, Inc., Milwaukee, has been organized with a nominal capital of 500 shares of common stock without par value to manufacture machinery, tools, implements, etc. The incorporators are Paul C. Fritzsche, head of the Brenner Mfg. Co., 705 South Pierce Street, contracting machinist, and Frank E. Icke, assistant superintendent A. E. Martin Foundry Co., Milwaukee. Definite plans will be made public later.

The Racine, Wis., Pure Milk Co., 1010 Thirteenth Street, is taking bids for the construction and equipment of a combination boiler and engine house and artificial refrigerating plant, estimated to cost \$45,000. Cahill & Douglas, 217 West Water Street, Milwaukee, are consulting engineers.

The Bay Verte Machine Co., Green Bay, Wis., jobber and dealer in machine tools, factory equipment, etc., and conducting a large repair shop, will double its floor space by the lease of an existing building or the erection of a new plant and warehouse. Its business in 1922 was 40 per cent greater than in the previous year. D. I. Nelson resigned as president because of other duties in the Nelson Machinery Co., Green Bay, but remains treasurer. Lynn D. Joseph is president; L. W. Whitmore, vice-president; G. E. Forkin, secretary, and William Hinkle, general manager.

The Simmons Co., Kenosha, Wis., is awarding contracts for additions to the main works in Kenosha to be equipped for the production of steel chairs, dressing tables, dressers, chiffoniers, etc. The total investment in plant and equipment is estimated at \$1,000,000. The Simmons Co. operates nine plants in various parts of the United States. It has decided to transfer its executive department to New York and the headquarters of the central division to Chicago. Z. G. Simmons, president, is removing his residence from Kenosha to New York about March 1.

## Chicago

CHICAGO, Feb. 5.

**M**ACHINE tool business is still of moderate proportions, but is coming from a greater diversity of buyers, indicating a general revival of industrial activity. At the same time, metal-working plants show a tendency to increase manufacturing space for the first time in two years. Among companies building extensive additions are the Miehle Printing Press & Mfg. Co. and the Goodman Mfg. Co., both of Chicago, the Simmons Co., Kenosha, Wis., and the Pawling & Harnischfeger Co., Milwaukee. A new plant is being constructed by the American Electric Fusion Corporation, Chicago. The Ingersoll Milling Machine Co., Rockford, Ill., has opened a department for the manufacture of milling cutters for which it has purchased a No. 78 Wilmarth & Morman surface grinder and a vertical shaper. It is understood that it will also purchase a key-seating milling machine and possibly some other equipment.

The automotive interests continue to buy a few tools from time to time. The Nash Motors Co., Kenosha, Wis., has placed orders for two cylindrical grinding machines. Among the railroads, the Chicago, Milwaukee & St. Paul has closed for a new 8-ft. boring mill and two used surface grinding machines, while it is still considering a journal turning and quartering machine and a slab miller. The Monon is in the market for a bending roll, and an inquiry has been received from the Grand Trunk at Montreal for a 16-in. gap lathe.

The Goodman Mfg. Co., Chicago, has put out an inquiry for the following cranes for an addition: One 20-ton, 51-ft. span cage-operated crane, one 25-ton, 51-ft. span cage-operated crane, and two 20-ton, two 25-ton, two 15-ton and two 10-ton, 26-ft. span floor-operated electric cranes. The Whiting Corporation, Harvey, Ill., has received an order for a second 120-in. cupola from Frank D. Chase, Inc., engineer, Chicago, for the new Pullman Co. foundry, Pullman, Ill., and a 30 x 60-in. tumbling mill from the Eclipse Lawn Mower Co., Prophetstown, Ill.

The American Electric Fusion Corporation, 92 Montana Street, Chicago, has broken ground in the block of Diversy Boulevard, between Rockwell and Tallman Streets, for a two-story plant, 80 x 130 ft. This building will be under roof within 60 days and other units will be completed before the end of the year, which will give the company a total of 60,000 sq. ft. of floor space. It was organized in September, 1920, by E. J. Henke, president, and others.

The Commonwealth Edison Co., Chicago, is taking bids through Graham, Anderson, Probst & White, 80 East Jackson Boulevard, on the first unit of a large power plant to be built at South Crawford Avenue and the drainage canal. This section will be four stories, 119 x 211 ft.

Eugene C. Ecker & Associates, 110 South Dearborn Street, Chicago, have begun work on a one-story welding shop at 2613-17 South State Street, for L. A. Malchor, lessee, formerly with the Oxweld-Acetylene Co. It will cost \$25,000.

The Ford Motor Co., Detroit, has let contract for a one-story plant, 502 x 1363 ft., at 12,600 to 12,760 Torrance Avenue, Hegewisch, Ill., to cost \$1,200,000.

The Bike Web Mfg. Co., 4113-25 Ravenswood, Chicago,

has let contract for a one-story plant, 80 x 164 ft. and 20 x 80 ft., to cost \$40,000.

The Pettibone-Mulliken Co., manufacturer of frogs and switches, 4710 West Division Street, Chicago, has let contract for a one-story addition, 130 x 400 ft., to cost \$200,000.

The Biflex Products Co., manufacturer of automobile bumpers, North Chicago, Ill., is completing an addition containing 30,000 sq. ft. of floor space, which will double its present capacity.

The Wisconsin Metal Mfg. Co. is installing machinery in a plant on East Spring Street, Chippewa Falls, Wis., for the manufacture of sheet metal products.

The plant of the Kansas City Malleable Castings Co., Kansas City, Mo., which has been idle for 20 months, has resumed operations with a force of 50 men. The company was refinanced by the Dayton Malleable Iron Co., Dayton, Ohio, and John C. Haswell, president of the Dayton company, is also president of the Kansas City company.

The Kansas Gas & Electric Co. has started the construction of a power plant on the Neosho River, ten miles east of Parsons, Kan.

The Frantz Mfg. Co., 303 Third Street, Sterling, Ill., manufacturer of hardware products, is having plans drawn for a one-story addition, to cost \$30,000, work to begin in March. Ashby, Ashby & Schultze, 1511 West Jackson Boulevard, Chicago, are architects. Peter Frantz is president.

A manual training department will be installed in the three-story junior high school, 116 x 140 ft., to be erected at Cedar Rapids, Iowa, estimated to cost \$150,000, for which bids will be asked on a general contract about Feb. 15. J. G. Ralston, 712 L. & J. Bank Building, Waterloo, Iowa, is architect.

Bids will soon be asked by the City Council, Kewanee, Ill., for the installation of a municipal electric light and power plant to cost \$125,000. Burns & McDonnell, Interstate Building, Kansas City, Mo., are engineers.

The Schoitz Tool, Gear & Machine Co., 227 West Sixth Street, Waterloo, Iowa, has plans for a one-story factory, 50 x 121 ft., at Commercial Street and Mullen Avenue. Howard Burr, 603 Commercial Building, is architect.

The Diamond Steel Products Co., Minneapolis, Minn., recently formed to manufacture pistons and other automotive products, has acquired the works of the Allied Tractor Co., 1414 Marshall Street, N. E., for its proposed plant. It will be remodeled and additional equipment installed. Plans are also being drawn for an addition on adjoining property to cost \$100,000, including machinery.

Manual training departments will be installed in the new schools to be erected at Sioux City, Iowa, for which a special election has been called on March 12 to vote bonds for \$850,000. The structures will consist of a senior high school at Morningside to cost \$425,000; central junior high school, \$300,000; and East junior high school, \$125,000. H. C. Roberts is secretary of the Board of Education.

The Burlington Glass Co., 315 Tama Building, Burlington, Iowa, is considering the erection of a new one and two-story plant, 150 x 450 ft., on North Main Street, estimated to cost \$250,000, with equipment. W. A. Rayburn is president.

A manual training department will be installed in the new two-story and basement high school, 150 x 410 ft., to be erected at St. Charles, Minn., estimated to cost \$170,000, for which bids on a general contract will be received until Feb. 15. George Pass & Son, Ekle Building, Mankato, Minn., are architects.

A manual training department will be installed in the two-story high school, 100 x 105 ft., to be erected at Canton, Minn., estimated to cost \$100,000. B. O. Boyum, Petersen, Minn., is architect.

Thompson Neallon, Chicago, care of A. Epstein, 2001 East Pershing Road, engineer, has plans in progress for a one-story machine shop on Morgan Street to cost \$30,000.

## The Gulf States

BIRMINGHAM, Feb. 5.

**T**HE plant of the Ajax Foundry Co., Anniston, Ala., has been acquired by the Independent Soil Pipe Co., recently organized with a capital of \$75,000, which will continue operations for the manufacture of cast iron pipe. Extensions are planned. R. B. Carr is secretary, and R. T. House, general manager.

The O'Neal Lime Works, Inc., Calera, Ala., is perfecting plans for a new plant estimated to cost \$500,000, including machinery. The initial works will have 10 brick and steel kilns and finishing plant to develop a capacity of 1,000,000 bbl. per annum. A list of equipment will soon be prepared.



to include about 80,000 lb. of steel plates and 6800 lb. of steel castings. John H. Adams is president.

The Texas Sugar Refinery Co., Texas City, Tex., has plans in preparation for a new refinery, estimated to cost \$250,000 with machinery.

R. E. Boggs, Jefferson County Bank Building, Birmingham, machinery dealer, is inquiring for a 150-kw. electric generator with engine, direct-connected, with auxiliary power plant equipment; also for coal mining machinery.

The Woodward Body Works, Inc., Austin, Tex., recently reorganized, will operate a plant to manufacture truck bodies for Ford cars, comprising a main one-story building, 105 x 300 ft., and four one-story structures, each 60 x 200 ft. Equipment will be provided for metal and wood bodies. Samuel Sparks is president, and J. A. Nichols, manager.

The Quanah Light & Ice Co., Quanah, Tex., will install additional equipment at its local power plant to increase the capacity to 2000 hp. The ice-manufacturing plant will also be extended.

The Long Bell Lumber Co., Long and Bannister Streets, Kansas City, Mo., will build a new unit at its Longville, La., mills to manufacture flooring, estimated to cost \$200,000, with machinery.

The Jacobi Lumber Co., Molino, Fla., is planning to rebuild its lumber plant, planing mill and power house, recently destroyed by fire with loss of \$200,000, including equipment. The new works will cost close to a like amount.

The Talladega Pipe Co., Talladega, Ala., manufacturer of cast iron pipe, will make enlargements in its foundry and install additional equipment. E. O. Norman, superintendent, is in charge.

The Department of the Interior, Washington, will receive bids until Feb. 19 for two 3-stage air compressors, with motors, 440 volts, and spare parts, for installation at the United States helium plant, North Fort Worth, Tex.

Erection will commence on three buildings for the school board at Port Arthur, Tex., consisting of a vocational school, science school and power house, estimated to cost \$400,000. William B. Ittner, Board of Education Building, St. Louis, is architect.

The Dallas Power & Light Co., Dallas, is completing plans for its proposed local two-story generating plant, 112 x 155 ft., estimated to cost \$2,180,000 with machinery. It will be steam operated. The electric generators and other equipment will cost \$1,500,000; the steam installation will approximate \$615,000. The station will have a capacity of 32,000 hp. C. E. Caddie is president.

The Reed Furniture Mfg. Co., Little River, Fla., has acquired a two-story building and plans the early installation of woodworking machinery, planer, band saw and power equipment. C. F. Moffett, 71 East Forty-sixth Street, Miami, Fla., is secretary and treasurer.

The City Commission, Highland Park, Highland, Tex., will install electrically-operated pumping machinery in connection with the installation of a waterworks, estimated to cost \$125,000. Meyer & Noyes, Dallas County Bank Building, Dallas, Tex., are engineers.

Kingan & Co., Inc., Tampa, Fla., is perfecting plans for a new ice-manufacturing and cold storage plant at Whiting and Governor Streets, estimated to cost \$100,000, including machinery. F. J. Kennard, Tampa, is architect. V. A. Davis is local manager.

The Marine Ways Machine Co., St. Petersburg, Fla., is planning for the installation of a power hammer at its shop.

The State Bond Improvement Commission, Jackson, Miss., will take bids until Feb. 24 for a central power house at the Mississippi College for Women, Columbus, including water-tube boilers, hand-fired stokers, electric equipment, pumping machinery, etc.

## Indiana

INDIANAPOLIS, Feb. 5.

**M**OTORS, ovens, conveying and other equipment will be installed in the four-story and basement plant to be constructed by the Ward Baking Co., Southern Boulevard and St. Mary's Avenue, New York, at South Bend, Ind., estimated to cost \$1,000,000.

The Kennedy Car Liner & Bag Co., Shelbyville, Ind., manufacturer of paper products, is planning to rebuild its local works, occupying a 3-acre site, destroyed by fire, Jan. 29, with loss estimated at \$200,000, including machinery. Headquarters will temporarily be removed to the branch plant at Greensburg, Ind. Fred W. Kennedy is president, and B. F. Swain, treasurer.

Bids will be taken on a general contract until Feb. 24 for a two-story and basement manual training high school, 100 x 120 ft., at Michigan City, Ind., to cost \$100,000. Freyermuth

& Maurer, Farmers' Trust Building, South Bend, Ind., are architects.

The Dudlo Mfg. Co., Fort Wayne, Ind., manufacturer of electric coils, wire, etc., is planning to rebuild the portion of its plant destroyed by fire Jan. 29, including enameling equipment and other machinery. An official estimate of loss has not been made.

The American Colitic Stone Co., operated by the Snyder-Willings Co., Toledo, Ohio, is planning for the installation of a stone quarrying and crushing plant at Bloomington, Ind., to cost \$150,000, with machinery and power equipment.

The Jeffersonville Service Co., Jeffersonville, Ind., E. M. Frank, head, is contemplating the erection of a two or three-story ice-manufacturing and cold storage plant, 80 x 150 ft., estimated to cost \$80,000, including machinery.

The Alexander Box Co., 1102 Trumbull Street, Indianapolis, has plans for the erection of a new unit to cost \$30,000. The company has recently completed a second building at its factory and will provide machinery to more than double the present capacity.

The Elkhart Motor Car Co., Auburn, Ind., has tentative plans for the erection of a new one and two-story works on the East Side for parts production and assembling. Willson Dennison is treasurer.

P. H. Mueller, 789 Hohman Street, Hammond, Ind., is taking bids on a general contract for a new two-story and basement plant to manufacture tin and other metal products, estimated to cost \$25,000.

## The Central South

ST. LOUIS, Feb. 5.

**T**HE Atchison, Topeka & Santa Fe Railway Co., 80 East Jackson Boulevard, Chicago, has purchased property at Emporia, Kan., for the erection of two engine houses, machine shops, car repair shops, power house and other buildings, to more than triple the capacity of the present car and locomotive shops. An appropriation of \$5,000,000 is being arranged for the work.

A manual training department will be installed in the proposed two-story high school to be erected at University City, Mo., estimated to cost \$135,000. William B. Ittner, Board of Education Building, St. Louis, is architect.

The Great Western Stove Co., Leavenworth, Kan., has awarded contract to the Baer Engineering & Construction Co., First National Bank Building, for a new two-story and basement building.

The Hewitt Refining Co., Ardmore, Okla., has acquired property at Wilton, Okla., for a new oil refinery with initial capacity of about 1500 bbl. per day. C. E. Sykes is president, and Ross W. Coe, secretary and treasurer.

The Larimore Hydraulic Transmission Co., 620 Landers Building, Springfield, Mo., recently organized with a capital of \$1,000,000 to manufacture hydraulic machinery and equipment, has arranged for the establishment of a temporary plant at 306 West McDaniel Street. The present building will be extended at an early date, or another plant site secured. J. E. Cahill is president, and J. W. Miller, vice-president and general manager.

A manual training department will be installed in the proposed high school to be erected at Aurora, Mo., estimated to cost \$80,000. An election to vote bonds will be held Feb. 27.

F. M. Lege, Jr., Dallas, Tex., and associates, have organized a company to build and operate an oil storage and distributing plant in the Ouachita County oilfields, near Smackover, Ark., with capacity of 5,500,000 bbl., estimated to cost \$2,000,000, including tanks, pumping plants, pipe lines and distributing machinery.

The St. Louis & San Francisco Railroad Co., St. Louis, has tentative plans for additions to its car and locomotive shops at Fort Smith, Ark., to cost approximately \$100,000, including equipment.

A manual training department will be installed in the new Northwest junior high school to be erected at Eighteenth Street and Haskell Avenue, Kansas City, Kan., estimated to cost \$250,000, for which bids are being asked on a general contract until Feb. 15. Rose & Peterson, 432-40 Brotherhood Block, are architects.

The American Ice Co., Agnes Avenue, Kansas City, Mo., is arranging for the erection of a two-story ice-manufacturing plant, 80 x 130 ft., at 4730 Tracy Avenue, estimated to cost \$80,000. G. Carman, 406 Gumbel Building, is architect.

The Dean Metal Co., 108 Pine Street, St. Louis, recently organized, will operate a plant for the manufacture of metal cabinets and toilet specialties. Eugene G. Dean is secretary and treasurer.

An electrically-operated pumping plant will be installed at the municipal waterworks, Holden, Mo., in connection with

extensions and improvements estimated to cost \$80,000. The Benham Engineering Co., 512 Gumbel Building, Kansas City, Mo., is engineer.

The Central Producing & Refining Co., Bowling Green, Ky., has acquired property in Warren County and plans the construction of a new oil refinery.

The Louisville Railway Co., West Jefferson Street, Louisville, has plans in progress for rebuilding its car shops and barns at Fourth Avenue and A Street, recently destroyed by fire. The work will cost approximately \$100,000. D. X. Murphy & Brothers, Louisville Trust Building, are architects.

The Moloney Electric Co., South Seventh Street, St. Louis, manufacturer of transformers and other electric power equipment, has acquired property at Toronto, Ont., for a new plant.

The Athens Plow Co., Athens, Tenn., recently organized with a capital of \$100,000, has purchased a site for a new one-story foundry and machine shop. R. J. Fisher is president, and E. L. Willson, secretary and treasurer.

The Tennessee Eastern Electric Power Co., Johnson City, Tenn., will install a new turbo-generator and auxiliary machinery at its power house at Greenville, Tenn.

Electrically-operated pumping machinery will be installed at the municipal waterworks, Okmulgee, Okla., in connection with extensions and improvements to cost \$150,000. T. J. Embree, Okmulgee, is engineer.

The Rock Asphalt Co., Bowling Green, Ky., is considering the erection of a new refining plant on the Green River, near Brownsville, Ky., estimated to cost \$200,000, with machinery. W. E. Massey is president.

## The Pacific Coast

SAN FRANCISCO, Feb. 6.

BIDS are being taken by the Southern Pacific Railroad Co., Los Angeles, for a one-story car repair shop, 80 x 280 ft.; two-story forge and blacksmith shop, 155 x 340 ft.; one-story boiler shop, 195 x 255 ft.; one-story oil house, 36 x 112 ft.; two-story power house, 40 x 115 ft.; locomotive house and other buildings. The installation will comprise a number of electric traveling cranes. The plant is estimated to cost \$1,000,000, including machinery.

The National Ice & Cold Storage Co., Riverside, Cal., will build a new ice-manufacturing plant on adjoining site, 100 x 100 ft., estimated to cost \$80,000 with equipment. The present plant will be improved.

The Westinghouse Electric & Mfg. Co., First National Bank Building, San Francisco, has awarded contract to the Ralph McLeran Co., Hearst Building, for the first unit of its proposed new plant at Emeryville, Cal., estimated to cost \$250,000. The new plant will be used for the manufacture of insulators and other electrical products, and will be operated by the Westinghouse High Voltage Insulator Co., a subsidiary. R. P. Jackson is general manager.

The Metal & Thermit Corporation, 120 Broadway, New York, and Swift Street, South San Francisco, has plans for new works on a 14-acre tract on Swift Street, to cost about \$1,000,000 with machinery. The engineering department of the company, New York, is in charge. E. W. Kardos is San Francisco manager.

The Washington Water Power Co., Spokane, Wash., will build an addition to its hydroelectric power plant at Long Lake to increase the capacity 22,500 kw., estimated to cost \$250,000 with machinery.

The Hedlund Box & Lumber Co., Spokane, Wash., has plans for a new one-story factory on Mallon Avenue, 120 x 240 ft., estimated to cost \$100,000 including machinery. D. C. Hedlund is president.

A manual training department will be installed in the new Sequoia Union high school to be erected at Redwood City, Cal., estimated to cost \$300,000.

The Readers Welding Works, Sacramento, Cal., has awarded contract to J. W. Lattin, Sacramento, for a new one-story machine and welding works, estimated to cost \$30,000.

The Perfect Caster Mfg. Co., Chino, Cal., has plans in for a new factory to manufacture casters and other hardware products, estimated to cost \$30,000. The company is headed by George Holcomb and W. S. Reilly.

The Pacific Portland Cement Co., Gerlach, Nev., will commence the construction of a new plant, estimated to cost \$300,000, including machinery. Headquarters of the company are in the Pacific Building, San Francisco.

The Union Ice Co., Willows, Cal., will build a new ice-manufacturing and cold storage plant on South Tehama Street, estimated to cost \$80,000.

The Board of Works, Seattle, Wash., will commence the erection of the proposed municipal electric power plant at George Creek, to cost \$100,000.

## Canada

TORONTO, Feb. 5.

WHILE the demand for machine tools is confined almost entirely to units of one or two, chiefly for replacement, a fairly large volume of business is in sight. The Toronto Transportation Commission is having a list prepared for equipment for its new car shops. The Durant Motor Co. is completing an addition to its plant at Leaside, and some equipment buying will be necessary before operations start in the early spring. The Ford Motor Co. of Canada will be in the market for equipment for the assembling plant on Danforth Avenue, Toronto, and will also require equipment for its works at Ford, Ont., now under construction. The Canadian National Railways has just issued a small list of tools and machinery for its shops at Leaside, and buying for other shops is also proposed.

A strong demand continues for wood-working tools and general machinery. Electrical equipment and supplies are in active call, with several large water power developments proposed which will greatly augment sales for this class of equipment.

Prices are firm on all lines, and while no statement has been made recently regarding advances, higher quotations are expected in some quarters.

The Quebec Development Co., Quebec, organized to develop water power on the Grand Discharge and Lake St. John, north of Quebec, is calling for bids on power plant equipment. It is proposed to install 12 turbines, each with a capacity of 35,000 hp., during the next four years.

The erection of a pulp and paper mill at Fort Alexander, about 70 miles from Winnipeg, will be started this spring by J. D. McArthur & Co., Ltd. The scheme also provides for the construction of a railroad 20 miles long, from Beacons to Fort Alexander, and the total expenditure will amount to \$3,000,000. The plant, which will have a capacity of 120 tons per day is expected to be completed within two years.

The Electroplax Co., Toronto, manufacturer of electric supplies, equipment, etc., will soon call for bids for the erection of a plant at Mount Dennis, Ont., to replace the one recently destroyed by fire. H. E. Cory is general manager. H. M. Hyland, Weston, Ont., is engineer.

Bids will be received by the Public Utility Commission, Whitby, Ont., W. J. Luke, chairman, until Feb. 22, for centrifugal pumps, motors, gasoline engines, etc., in connection with the waterworks system.

Bids will be called about Feb. 10 for an addition to the plant of Cutten & Foster, Church Street, Toronto, manufacturer of automobile tops, etc. W. F. Sparling & Co., University Avenue, Toronto, are architects.

The London Shipping Containers, Ltd., London, Ont., has purchased adjoining property and will build an addition, 45 x 370 ft. The building will be one-story, of concrete and brick, with basement containing silicate tanks and boiler departments.

The Brantford Brass Foundry, Ltd., Brantford, Ont., has been incorporated with a capital stock of \$100,000 to take over the business formerly carried on by the Brantford Brass Foundry Co. Plans are under way for increasing the present capacity for the production of brass, bronze and aluminum castings, art ware, builders' hardware, etc.

E. T. Nesbitt, Quebec, Que., will rebuild his planing and sawmill recently destroyed by fire. It will be of brick, 116 x 110 ft., and will require new machinery.

The Steel City Sheet & Tin Plate Co., 614 Second Avenue, Pittsburgh, although incorporated some time ago to manufacture iron and steel products, is doing a jobbing business. It proposes to stock in warehouse at Pittsburgh galvanized and black sheets, tin and terne plate, solder, copper, pipe and allied lines, soliciting particularly the business of tanners and sheet metal workers. E. W. Brautigan, for 10 years in the auditing department of the Pittsburgh Coal Co. and latterly with Follansbee Brothers Co., Detroit, as office manager, is treasurer. Herbert B. Jones, who was with Follansbee Brothers Co. for 20 years, the last four of which he was district manager of the Detroit sales office and warehouse, is president.

Harry E. Harris, Bridgeport, Conn., engineer specializing on manufacturing methods, has taken over the activities of Hubbard, Harris & Rowell, Inc., and will personally direct all work of organization, installation, equipment designs and economic investigations.



## Plans of New Companies

The Bassett Metal Goods Co., Derby, Conn., recently incorporated with capital stock of \$1,200,000 to manufacture hardware and metal specialties, elected the following officers at a meeting held lately: Friend A. Russ, Greenwich, Conn., president; B. H. Faulkner, Mt. Clair, N. J., treasurer; J. B. Russ, Huntington, Conn., secretary. In addition to the officers, the board of directors consists of Joseph Siegel, Detroit; J. J. Newmann, New Haven, Conn.; S. J. Leonard, New York; D. W. Northrup, New Haven, Conn.; E. S. Bennett, Worcester, Mass.; and H. J. Stuart, Derby.

The Sterling Lighting Studio, Inc., 38 Park Street, Brooklyn, N. Y., has been incorporated with capital stock of \$20,000 to manufacture lighting fixtures and kindred products. It has leased a plant equipped for manufacturing this line. The incorporators are: M. Black and H. Cohn.

The Acme Tool & Mfg. Works, 608-610 Devon Street, Arlington, N. J., incorporated with capital stock of \$50,000, has taken over the business formerly conducted by A. J. O'Malley, manufacturing power presses and screw machine products. The company will also manufacture universal dividing heads, tools, dies and jigs. In addition to the regular work, special products will be manufactured under contract for the Riley Klotz Mfg. Co., Newark, N. J. Fred C. Van Gieson is vice-president and treasurer.

The Charles Albert Co., New York, recently incorporated with \$750,000 preferred stock and 4,000 shares of common stock no par value, has written into its broad charter the manufacture of revolvers and other fire arms. Within a few days a directors' meeting will be held to decide upon what particular branch of manufacturing the company will enter. Plant location and details of operation will be decided upon in the near future. The incorporators are: J. B. May, A. S. Cutler and J. P. Grant. A. S. Cutler of the firm Foster & Cutler, 233 Broadway, New York, is counsel for the company.

The Auto Raising Device Co., care of Benjamin Marcus, 300 Madison Avenue, New York, has been incorporated with capital stock of \$100,000 to manufacture auto jacks and kindred products. Patent rights have been secured on a new design of auto jack, iron models of which are now being made. The financial organization has been completed but no specific plans have been made for manufacturing, and it is likely that nothing will be done in this direction for about six weeks. The incorporators are: J. S. Lasdon, G. F. Meyers and H. Willard.

Ponches-Voelker, Inc., Brooklyn, N. Y., has been incorporated with authorized capital of \$75,000 to manufacture scientific equipment and mechanical apparatus. However, no actual manufacturing will be done, at least in the immediate future, the company acting merely as an importer of dental supplies. The incorporators are: P. Ponches, J. Voelker, and F. W. Kristeller, the latter of the firm, Watson, Kristeller & Swift, 68 William Street, New York, is counsel for the company.

The Arrow Emblem Co., 7 Maiden Lane, New York, has been incorporated with capital stock of \$20,000 to manufacture metal specialties. The incorporators are: S. Marks, S. W. Stern and S. Astrick.

The Ignition Lock Co. of America, Inc., care of A. Valensi, 47 Beaver Street, New York, has been incorporated with capital stock of \$45,000, to manufacture locks and locking devices. The object of the organization is to exploit a patented lock but apart from the procedure of incorporating, nothing has been done in preparation for actual operation and nothing is likely to be done for a while. The incorporators are: A. J. Abadis, H. L. Wilkins, Jr., and W. J. Valensi.

The Pompeian Bronze Co., 603 Dean Street, Brooklyn, N. Y., which was recently incorporated with authorized capital of \$100,000 to manufacture art bronze and similar products, has acquired the assets and business of a partnership which has manufactured a general line of bronze articles for two years. It was stated by those in interest that present quarters are limited and that the expected increase in business will create a need for expansion into a plant of greater facilities. This change, however, will not be reckoned with immediately. The incorporators are: P. L. Pusteria and P. Manfredi.

Louis Baldinger & Sons, Inc., Brooklyn, N. Y., recently incorporated with capital stock of \$15,000 to manufacture gas and electric fixtures, has a fully equipped plant and will continue a business established for some time in this line. The incorporators are: H. S. Landau and H. Nash. Address R. J. Baldinger, 57 Harrison Avenue, Brooklyn, N. Y.

The Murphy Furnace Co., Seventeenth Street and First Avenue, Beaver Falls, Pa., recently incorporated with capital stock of \$50,000, will engage in the manufacture and installation of warm air furnaces. For the beginning a two-story building will be constructed 30 x 60 ft., which will be used for making fittings and for storage. This building is to be built by contract to be awarded within a few days.

The company will be in need of tin shop equipment, also casing rings, galvanized sheets, pipes, boots, etc. No commitments have been made yet except for castings, which will be made by the Murphy Foundry Co., another concern recently incorporated in Pennsylvania with capital stock of \$50,000. This latter company has been in existence for 12 years as a partnership. No changes have been made except in the form of the business. W. G. Murphy is vice-president of the Murphy Furnace Co.

The Tri-State Motor Co., El Paso, Tex., recently incorporated with capital stock of \$300,000 to manufacture automobile equipment, has a plant and equipment sufficient for present operations. Address J. W. Kirkpatrick, El Paso, Tex.

The Ever-Ready Wrench Co., 279 Chicago Street, Buffalo, has been incorporated with capital stock of \$25,000 to manufacture wrenches and other hardware products. No plans have been made for manufacture, but the company will have its wrenches made by contract. T. W. Van Arsdale is the chief incorporator.

Lelong-Kendick Co., Inc., Halsey, Marshall and Nevada Streets, Newark, N. J., was recently incorporated with capital of 1000 shares of common stock, no par value, to manufacture metal alloy products. It will occupy a large part of the premises of L. Lelong & Brother, and will manufacture particularly for the electrical, chemical and dental trades. The officers are: Louis Lelong, president; Richard Downing, vice-president; G. L. Feldman, secretary; and K. A. Depew, treasurer and manager.

The National Pipe & Nipple Co., 124-132 Wilkins Street, Baltimore, Md., incorporated with capital stock of \$100,000, has a shop in operation manufacturing pipe nipples, pipe fittings and iron and steel specialties. This company is in the market for pipe in car lots, both black and galvanized, also for second hand threading machines and bolt and pipe machines. J. Spencer Clark is president and R. W. Judick is secretary-treasurer.

Glander & Co., Inc., 800 Broad Street, Newark, N. J., has taken over the business formerly conducted by R. H. Glander, trading as Glander & Co., and has been incorporated with capital stock of \$50,000. The company will engage in general engineering, contracting, buying, selling and dealing in new and used machinery, power and chemical equipment. The incorporators are: R. H. Glander and E. H. Brennan, Jr., secretary and treasurer.

## Trade Changes

Effective Feb. 1, the address of the Detroit plant of the Morse Chain Co., was changed 7601 Central Avenue.

William Pestell, sales manager of the Sanford Riley Stoker Co., has transferred his offices from New York to Worcester, Mass.

The Geo. T. Ladd Co., Pittsburgh, manufacturer of the Ladd water tube boiler, has appointed C. M. Decker as sales representative in the Philadelphia territory with offices at 2128 Land Title Building.

The H. E. Marks Corporation, manufacturer of Marks system gypsum roofs, Pittsburgh, has opened a New York sales office in charge of E. P. Cadwallader, room 69, 18 West Thirty-fourth Street; also a new Philadelphia branch in charge of T. R. Galey, with offices at 703 Harrison Building.

The Mine & Smelter Supply Co., with branches in Denver, Salt Lake City, Utah, and El Paso, Tex., has taken over the exclusive representation for the States of Colorado, Utah, Nevada, Wyoming, New Mexico and Western Texas for the Wilson Welder & Metals Co., Inc., 132 King Street, New York.

The Valls Engineering Co., Columbus, Ohio, of which reference was made in a prior issue, has got well under way and reports very encouraging prospects. It will have a wide field in designing and building special hoisting and similar equipment, it being the intention to work closely with consulting engineers and buyers who want something a little different from standard lines to meet their particular requirements.

The Yerkes Steel Coupling Tie Co., Harbour Creek, Pa., W. H. Yerkes, head, has acquired a 10-acre tract for the erection of a new plant to manufacture a patented steel railroad tie. The initial building will be 45 x 100 ft.

At the stockholders' meeting of the Bridge & Beach Mfg. Co., stoves and heaters, 4204 North Union Boulevard, St. Louis, held recently, the directors were re-elected. The following officers were elected by the board: Hudson E. Bridge, president and treasurer; L. H. Booch, vice-president and manager; Henry C. Hoener, vice-president; Louis H. Riecke, secretary; George Leighton Bridge, assistant secretary; A. F. Gammeter and Laurence D. Bridge, assistant treasurers.

# Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

## Iron and Soft Steel Bars and Shapes

<b>Bars:</b>	
Refined iron bars, base price.....	3.19c.
Swedish bars, base price.....	7.50c.
Soft steel bars, base price.....	3.19c.
Hoops, base price.....	5.04c.
Bands, base price.....	3.99c.
Beams and channels, angles and tees	
3 in. x ¼ in. and larger, base.....	3.29c.
Channels, angles and tees under 3 in.	
x ¼ in., base.....	3.19c.

## Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger.....	3.20c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)...	3.40c.
Toe-calk, ½ x ¾ in. and larger.....	4.15c.
Cold-rolled strip, soft and quarter hard—6.75c. to 7.75c.	
Open-hearth spring steel.....	4.00c. to 6.00c.
<b>Shafting and Screw Stock:</b>	
Rounds.....	4.05c.
Squares, flats and hex.....	4.55c.
Standard cast steel, base price.....	15.00c.
Extra cast steel.....	18.00c.
Special cast steel.....	23.00c.

## Tank Plates—Steel

¼ in. and heavier.....	3.29c.
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## Sheets

	Per Lb.
<b>Blue Annealed</b>	
No. 10.....	4.19c.
No. 12.....	4.24c.
No. 14.....	4.29c.
No. 16.....	4.39c.

## Box Annealed—Black

	Soft Steel C. R., One Pass. Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20.....	4.15 to 4.30c.	.....
Nos. 22 and 24.....	4.20c. to 4.35c.	4.60c.
No. 26.....	4.25c. to 4.40c.	4.65c.
No. 28.....	4.35c. to 4.50c.	4.75c.
No. 30.....	4.60c. to 4.75c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

## Galvanized

	Per Lb.
No. 14.....	4.35c. to 4.60c.
No. 16.....	4.50c. to 4.75c.
Nos. 18 and 20.....	4.65c. to 4.90c.
Nos. 22 and 24.....	4.80c. to 5.05c.
No. 26.....	4.95c. to 5.20c.
No. 27.....	5.10c. to 5.35c.
No. 28.....	5.25c. to 5.50c.
No. 30.....	5.75c. to 6.00c.

No. 28 and lighter, 36 in. wide, 20c. higher.

## Welded Pipe

<b>Standard Steel</b>		<b>Wrought Iron</b>	
Black	Galv.	Black	Galv.
½ in. Butt... —47	—31	½ in. Butt... —4	+19
¾ in. Butt... —52	—39	¾ in. Butt... —11	+9
1-3 in. Butt... —54	—41	1-1½ in. Butt... —14	+6
2½-6 in. Lap... —50	—37	2 in. Lap... —5	+14
7-8 in. Lap... —47	—20	2½-6 in. Lap... —9	+9
9-12 in. Lap... —42	—18	7-12 in. Lap... —3	+16

## Steel Wire

	Per Lb.
<b>BASE PRICE* ON NO. 9 GAGE AND COARSER</b>	
Bright basic.....	4.75c. to 5.00c.
Annealed soft.....	4.75c. to 5.00c.
Galvanized annealed.....	5.40c. to 5.65c.
Coppered basic.....	5.40c. to 5.65c.
Tinned soft Bessemer.....	6.40c. to 6.65c.

\*Regular extras for lighter gage.

## Brass Sheet, Rod, Tube and Wire

### BASE PRICE

High brass sheet.....	20¼c. to 21¼c.
High brass wire.....	20¼c. to 21¼c.
Brass rods.....	17½c. to 18½c.
Brass tube, brazed.....	27¼c. to 28¼c.
Brass tube, seamless.....	23¼c. to 24 c.
Copper tube, seamless.....	26¼c. to 26¾c.

## Copper Sheets

Sheet copper, hot rolled, 24 oz., 22¼c. to 23¼c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

## Tin Plates

<b>Bright Tin</b>		<b>Coke—14-20</b>			
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Prime	Wasters	
IC.. \$10.00	\$8.50	80 lb..	\$5.80	\$5.55	
IX.. 11.50	10.00	90 lb..	5.90	5.65	
IXX.. 13.00	11.25	100 lb..	6.00	5.75	
IXXX.. 14.25	12.50	IC..	6.15	5.90	
IXXXX.. 16.00	14.00	IX..	7.15	6.90	
		IXX..	8.15	7.90	
		IXXX..	9.15	8.90	
		IXXXX..	10.15	9.90	

## Terne Plates

	8-lb. coating, 14 x 20
100 lb. ....	\$7.00
IC .....	7.25
IX .....	7.50
Fire door stock .....	9.00

## Tin

Straits pig .....	42c.
Bar .....	50c. to 55c.

## Copper

Lake ingot .....	16 c.
Electrolytic .....	15¼c.
Casting .....	15½c.

## Spelter and Sheet Zinc

Western spelter .....	8¼c.
Sheet zinc, No. 9 base, casks.....	10¼c. open 10¼c.

## Lead and Solder\*

American pig lead .....	9c. to 9¼c.
Bar lead .....	12c. to 14c.
Solder, ½ and ½ guaranteed.....	30¼c.
No. 1 solder .....	29c.
Refined solder .....	26c.

\*Prices of solder indicated by private brand vary according to composition.

## Babbitt Metal

Best grade, per lb. ....	75c.
Commercial grade, per lb. ....	35c.
Grade D, per lb. ....	25c.

## Antimony

Asiatic .....	8c. to 9c.
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## Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....	27c. to 28c.
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## Old Metals

Prices are high and the market is firm. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible .....	12.75
Copper, heavy wire .....	12.00
Copper, light and bottoms .....	10.25
Brass, heavy .....	7.25
Brass, light .....	6.00
Heavy machine composition .....	9.50
No. 1 yellow brass turnings .....	7.00
No. 1 red brass or composition turnings.....	8.75
Lead, heavy .....	6.25
Lead, tea .....	4.75
Zinc .....	4.50



